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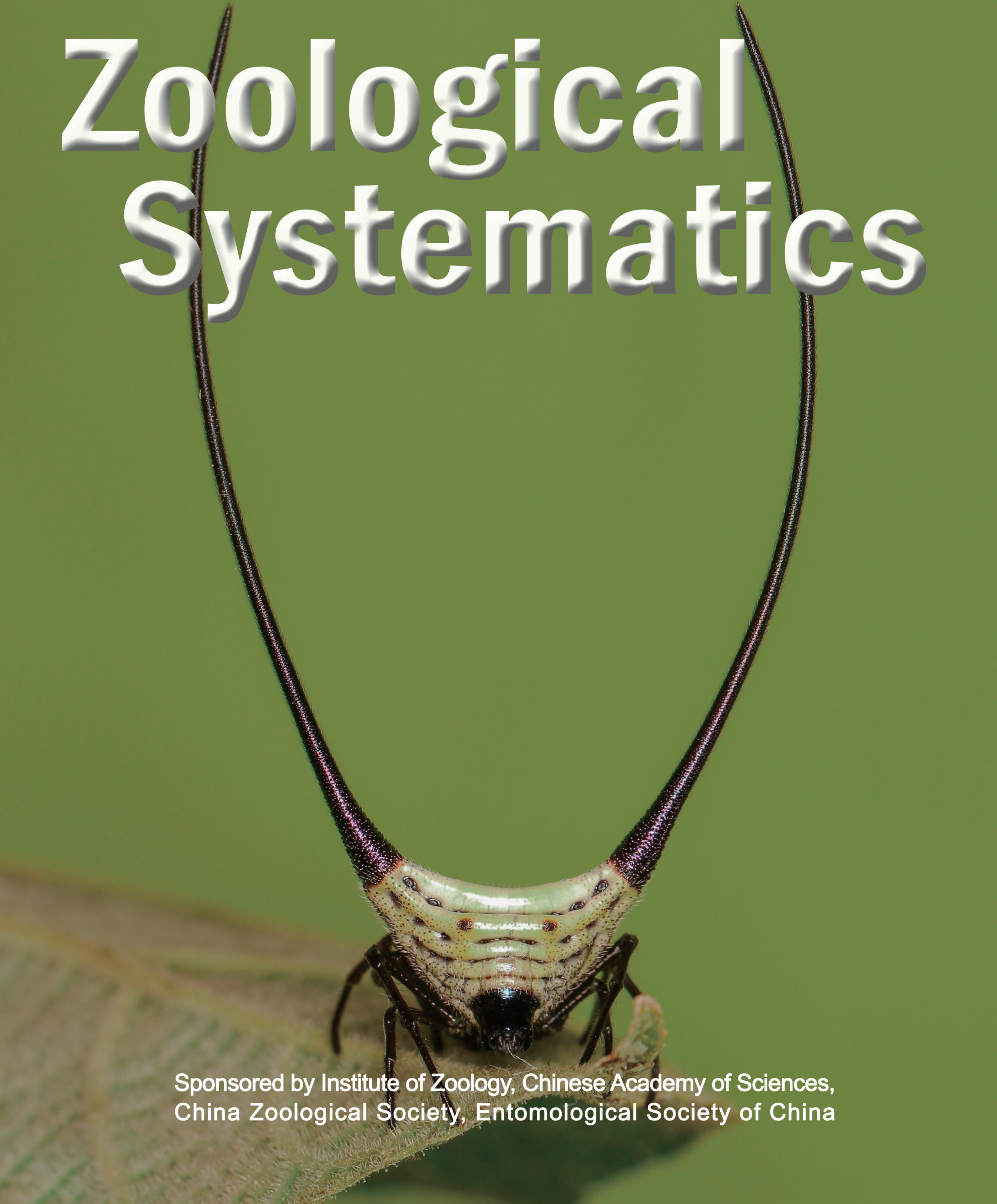

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ORIGINAL ARTICLE

A review of the genus *Synalpheus* (Crustacea: Decapoda: Caridea: Alpheidae) from China seas

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Abstract The genus *Synalpheus* (Decapoda: Alpheidae) from China seas is reviewed. Thirty one species belonging to this genus are described and illustrated in the present paper, including 4 new species and 6 newly recorded species from the China seas as following: *S. brevrostrus* **sp. nov.**, *S. jinqingensis* **sp. nov.**, *S. liui* **sp. nov.**, *S. tonkinensis* **sp. nov.**, *S. biunguiculatus* (Stimpson, 1860), *S. gracilirostris* de Man, 1910, *S. iphinoe* de Man, 1909, *S. lophodactylus* Coutière, 1908, *S. modestus* de Man, 1909 and *S. mortenseni* Banners, 1985. A key to 31 species of the genus *Synalpheus* from China seas is provided.

Key words Crustacea, *Synalpheus*, China seas, new species, taxonomy.

1 Introduction

Synalpheus Spence Bate, 1888, the second largest genus in the family Alpheidae (De Grave & Fransen, 2011), contains over 160 species (Hultgren *et al.*, 2014) currently. Because of the remarkably uniform appearance (Banner & Banner, 1975), it is also one of the most challenging shrimp genera in taxonomy (Anker & Tóth, 2008). Species of the genus are mostly sponge-inhabiting (Macdonald *et al.*, 2006), which leads specimens hard to collect. The genus was divided into six groups based on morphological characters, namely Comatularum, Brevicarpus, Laevimanus, Neomeris, Biunguiculatus and Paulsoni groups (Coutière, 1909). Then the Laevimanus group was replaced by the Gambarelloides group (Holthuis & Gottlieb, 1958) and the Biunguiculatus group was replaced by the Coutierei group (Banner, 1953). However, only three out of the six groups were consistently recovered as monophyletic based on morphological characters (Banner & Banner, 1975) and phylogenetic analysis (Hultgren *et al.*, 2014). Therefore, the species described in this paper would not be associated with any group in *Synalpheus*.

Serial researches have been done about the genus *Synalpheus* in the past several decades from the Indo-West Pacific (de Man, 1910, 1911; Banner & Banner, 1956, 1957, 1958, 1959, 1966, 1968, 1972, 1975, 1978, 1980, 1982, 1985; Miya, 1972; Chace, 1988). Banner & Banner (1978) ever listed 13 species of *Synalpheus* from South China Sea. Liu (2008) reported a checklist of the genus *Synalpheus* from China seas. Nevertheless, detail descriptions were absent in above two papers. In this paper, based on the collection of the Marine Biological Museum, Chinese Academy of Sciences (MBMCAS), 24 species of *Synalpheus* were found, including 4 new species and 6 newly recorded species. Moreover, 7 species reported from the South China Sea were not found in the present specimens. The present work described these species and provided a key to all the *Synalpheus* species from China seas.

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2 Materials and methods

All materials examined in this study are deposited in the Marine Biological Museum, Chinese Academy of Sciences (MBMCAS), including all the type materials. Specimens were examined, dissected and drawn using a dissecting microscope. Carapace length (CL) and total length (TL) were measured form the tip of the rostrum to the posterior margin of carapace and telson, respectively. All measurements are in millimeters (mm).

3 Taxonomy

3.1 Checklist of *Synalpheus* from China seas

Synalpheus bispinosus de Man, 1910
Synalpheus bituberculatus de Man, 1910
Synalpheus biunguiculatus (Stimpson, 1860) *
Synalpheus brevrostrus **sp. nov.**
Synalpheus carinatus (de Man, 1888)
Synalpheus charon (Heller, 1861)
Synalpheus coutierei Banner, 1953
Synalpheus demani Borradaile, 1900
Synalpheus fossor (Paulson, 1875)
Synalpheus gracilirostris de Man, 1910*
Synalpheus hastilicrassus Coutière, 1905
Synalpheus iocasta de Man, 1909
Synalpheus iphinoe de Man, 1909*
Synalpheus jinqingensis **sp. nov.**
Synalpheus liui **sp. nov.**
Synalpheus lophodactylus Coutière, 1908*
Synalpheus modestus de Man, 1909*
Synalpheus mortenseni Banner & Banner, 1985*
Synalpheus neomeris (de Man, 1897)
Synalpheus neptunus Dana, 1852
Synalpheus nilandensis Coutière, 1905
Synalpheus odontophorus de Man, 1909
Synalpheus paraneomeris Coutière, 1905
Synalpheus pescadorensis Coutière, 1905
Synalpheus pococki Coutière, 1898
Synalpheus stimpsonii (de Man, 1888)
Synalpheus streptodactylus Coutière, 1905
Synalpheus theano de Man, 1910
Synalpheus tonkinensis **sp. nov.**
Synalpheus trispinosus de Man, 1910
Synalpheus tumidomanus (Paul'son, 1875)

* Newly recorded species from the China seas.

3.2 Systematics

Alpheidae Rafinesque, 1815

Synalpheus Spence Bate, 1888

Homaralphaeus Spence Bate, 1876. *Proc. Roy. Soc. Lond.*, 1876: 378 (nomen nudum).
Homaralpheus Spence Bate, 1888. *Rep. Voy. Challenger Exped., Zool*.: 1–942.
Synalpheus Spence Bate, 1888. *Rep. Voy. Challenger Exped., Zool*., 24: 572. Type species: *Synalpheus jalcatus* Spence Bate, 1888 (=

Alpheus comalularum Haswell, 1882).
Alpheinus Borradaile, 1900. *In*: Willey, *Zool. Results*, fasc. 4: 415.
Zuzalpheus Ríos & Duff, 2007. *Zootaxa*, 1602: 7.

3.2.1 *Synalpheus bispinosus* de Man, 1910 (Fig. 1)

Synalpheus bispinosus de Man, 1910. *Tijdschr. ncd. dierk. Vereen.*, 11(4): 302; 1911, *Siboga Exped.*, 39(2): 280, fig. 54.

Material examined. (MBM 270524), 1♀, 1♂, CL 10.1 mm, TL 30.1 mm; CL 8.5 mm, TL 24.0 mm Tonkin Gulf (Beibu Gulf), Sta. 7502, depth 32 m, 21 August 1962; (MBM 159286), 1♂, CL 2.5 mm, TL 6.3 mm, Yezhu Island N-side, depth 9 m, 21 March 1992; (MBM 270607), 2♂, CL 4.5 mm, TL 11.5 mm, Tonkin Gulf (Beibu Gulf), Sta. 6218, depth 62 m, 18 April 1960, coll. Zhen-Gang Fan; (MBM 270606), 1♀, 1♂, CL 6.8 mm, TL 17.5 mm; CL 6.1 mm, TL 16.5 mm, Tonkin Gulf (Beibu Gulf), Sta. 6276, depth 26 m, 7 July 1960, coll. Shou-Peng Shen; (MBM 270475), 1♂, CL 4.5 mm, TL 11.5 mm, Tonkin Gulf (Beibu Gulf), Sta. 7902, depth 59 m, 10 October 1962; (MBM 270601),1♀, CL 5.1 mm, TL 12.8 mm, Tonkin Gulf (Beibu Gulf), Sta. 7503, depth 47 m, 15 January 1962, coll. Fu-Zeng Sun; (MBM 107770), 1♂, CL 4.5 mm, TL 11.1 mm, Yalong Bay, Yezhu Island N-coast, depth 8 m, from dead coral, 27 March 1992, coll. Newmann.

Description. Carapace smooth, glabrous; rostrum twice as long as wide at base, with lateral margins slightly convex, rounded tip bearing two short setae, reaching 1/2 length of visible part of first segment of antennular peduncle; orbital hoods three times as wide at base as rostrum, subequal to rostrum, with rounded tip bearing two short setae, notches between orbital hoods and rostrum V-shaped; pterygostomial corner produced into blunt acute angle.

Abdominal somites smooth, glabrous, posterolateral margin of sixth pleura each with one acute tooth; first-three pleura with posterior corner rounded; fourth and fifth pleura with lower margin produced into acute angle. Telson about 1.2 times as long as wide at base; lateral margin slightly concave posteriorly; dorsal surface with median groove, with two pairs of large spines, inserted approximately at 1/6 and 1/2 length of telson; posterior margin strongly convex, fringed with long setae, posterolateral angle each with two pairs of spines, lateral 1/2 length of mesial, posterolateral corner right angle.

Eyes concealed in lateral and dorsal view.

Antennular peduncle with distally acute stylocerite, latter reaching 1/3 of second segment of antennular peduncle; second segment twice as long as wide; visible part of first segment longer than second and about twice as long as third. Antenna with basicerite with acute distodorsal tooth, 1/4–1/3 length of distolateral tooth, latter subequal to stylocerite; carpocerite beyond end of antennular peduncle by length of third segment; scaphocerite blade narrow, 4/5 length of third segment of antennular peduncle, lateral spine with lateral margin slightly concave posteriorly, overreaching end of third segment, shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest, about 5 times as long as wide; penultimate segment about 1.7 times as long as wide at base; tip of ultimate segment bearing crown of 5–6 spine-like setae, with several brush consisting of 6–8 transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus three times as long as wide at base, superodistal margin ending in subacute tooth; carpus cup-shaped, with long setae distodorsally; chela cylindrical, not a bit compressed or twisted, with palm about 3.3 times as long as dactylus, distodorsal tooth palm subacute, slightly upturned; dactylus distinctly longer than pollex.

Minor chela with ventral margin of ischium bearing long setae; merus about 3.4 times as long as wide, longer than that of major cheliped, superodistal margin rounded, without any projecting, ventral margin bearing row of short setae; carpus cup-shaped proportionally longer that of major cheliped; palm about 1.7 times as long as fingers, lateral face near dactylus bearing patch of stiff setae; dactylus tapering, with flexor margin concave, distal single tooth, lateral margin bearing row of long setae; pollex tapering, with flexor surface obliquely convex, distal single tooth, lateral margin bearing row of long setae.

Second pereiopod with ischium distinctly shorter than merus; carpus five-segmented, segment ratio subequal to 4 : 1 : 1 : 1 : 2, with first segment shorter than sum of last four segment, segments 2–4 slightly wider than long; fingers 1.5 times as long as palm. Third pereiopod with merus longer than propodus, about 4.8 times as long as wide at base, without spines on ventral margin; carpus about 4/11 merus length, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with usual seven spines along ventral margin plus one distal pair of spines near dactylus; dactylus around 1/6 propodus length, biunguiculate, moderately slender, extensor tooth subequal to flexor tooth; extensor tooth as wide as flexor at base; notch between extensor and flexor tooth U-shaped. Fourth pereiopod generally similar to third; but ventral margin of carpus without distal spine. Propodus of fifth pereiopod with six transversal rows of setae along ventral margin plus one pair of spines near dactylus.

Variation. The smaller specimens may be an immature male having those following two differences: propodus of third pereiopod with ten spines along ventral margin rather than usual seven spines; notch between extensor and flexor tooth V-shaped.

Remarks. *Synalpheus bispinosus* was originally described by de Man (1910). It is closely related to *S. coutierei*, but different by the posterior margin of the sixth abdominal. Although Banner & Banner (1975) doubted the validity of this

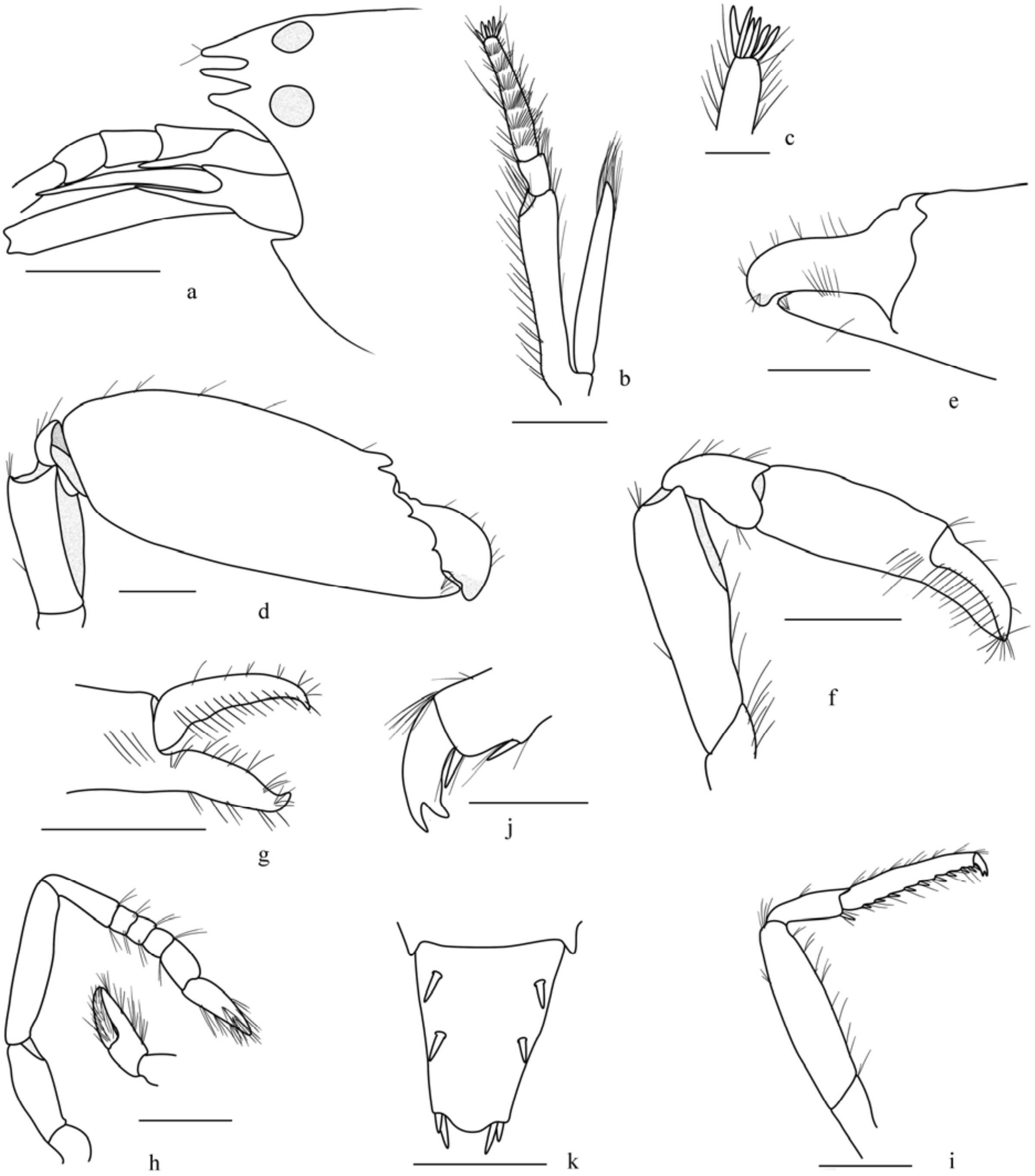

Fig. 1. *Synalpheus bispinosus* de Man, 1910, male (MBM 157976). a. Frontal region, lateral. b–c. Third maxilliped. b. Ventral. c. Tip, dorsal. d–e. Major cheliped. d. Lateral. e. Chela, mesial. f–g. Minor cheliped. f. Lateral. g. Chela, lateral. h. Second pereiopod, lateral. i–j. Third pereiopod. i. Lateral. j. Distal propodus and dactylus, lateral. k. Telson, dorsal. Scale bars: a–b, d–i, k = 1 mm; c, j = 0.25 mm.

species, they still accepted the specific name because of the stability of the above character and *S. bispinosus* had been not collected together with *S. coutierei*. Our research supports their point. The present specimens were also not collected with *S. coutierei* together, and the posterior margine of the sixth abdominal somite always bearing two spines on each side. Therefore, we also think *S. bispinosus* is a valid species.

This species maybe an social snapping shrimp, similar to the other six *Synalpheus* shrimp, including *S. regalis*, *S. filidigitus*, *S. fossor*, *S. hastilicrassus*, *S. neptunus neptunus*, *S.*aff. *neomeris* (Duffy & Macdonald, 1999; Didderen *et al.*, 2006), because some female specimens own the characters (1–5 pleura with posterior corner rounded, and second pleura proportionally longer and wider, carried huge number of eggs, apparently more than the smaller ovigerous female), which are similar to the characters of "queen" reported before.

Distribution. South China Sea; Indonesia; Australia.

3.2.2 *Synalpheus bituberculatus* de Man, 1910

Synalpheus bituherculatus de Man, 1910. *Tijdschr. ned. dierk. Vereen.* II (4): 294; 1911, *Siboga Fxped.*, 39a (2): 276, fig. 53; Banner & Banner, 1966. *Siam Soc. Mono.*, 3: pl. 66, fig. 22; Miya, 1972. *Publ. Amakus a Mar. Biol. Lab.*, 3 (1): 57, pl. 10.

Distribution. Taiwan, Hong Kong, South China Sea; Indian Ocean; Singapore; Thailand; Indonesia; Japan; Philippines; Australian.

Remarks. This species was reported by Banner & Banner (1978) and Liu (2008) from the South China Sea, but not found in the present specimens.

3.2.3 *Synalpheus biunguiculatus* (Stimpson, 1860)* (Figs 2–3)

Alpheus biunguiculatus Stimpson, 1860. *Acad. Nat. Sci. Phila., Proc.*, 1860: 31.
nec *Alpheus biunguiculatus* de Man, 1887. *Arch. f. Naturgesch.*, 53: 502, figs 6, 6a.
nec *Alpheus biunguiculatus* Spence Bate, 1888. *Challenger Rpt.*, 24: 562, pl. 51, figs 4, 4o, 4z.
nec *Synalpheus biunguiculatus* Coutiere, 1898. *Soc. Ent. de France, Bui.*, 11: 232, figs 1–4.
nec *Synalpheus biunguiculatus* Coutiere, 1905. *Fauna and Geog. Maid, and Laccad.*, 2(4): 873, pl. 71, fig. 8.

Material examined. 1♂, CL 3.1 mm, TL 8.2 mm, Dengqing island, 3 May 1958, coll. Zhen-Gang Fan, Jie-Shan Xu; 2♂, CL 4.2 mm, TL 10.1 mm, Subi Reef, Nansha Islands, Sta. 8, depth 2 m, 12 May 2004; (MBM 157909), 1♀ (non-ovigerous), CL 4.1 mm, TL 10.5 mm.

Description. Carapace smooth, glabrous; rostrum acute, twice as long as wide at base, with lateral margins slightly concave, acute tip bearing two short setae, slightly overreaching end of first segment of antennular peduncle; orbital hoods acute, much wider at base than rostrum, about 2/3 length of rostrum, notches between orbital hoods and rostrum V-shaped; pterygostomial corner produced into blunt acute angle; cardiac notch well developed.

Abdominal somites smooth, glabrous. Telson about 1.4 times as long as wide at base; lateral margin slightly concave posteriorly; dorsal surface with two pairs of spines, inserted approximately at 1/2 and 3/4 length of telson; posterior margin strongly convex, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/4 length of mesial, posterolateral corner right angle.

Eyes concealed in lateral and dorsal view.

Antennular peduncle stout, with distally acute stylocerite, latter hardly reaching end of second segment of antennular peduncle; second segment wider than long; visible part of first segment longer than second, later slightly longer than third. Antenna with basicerite without distodorsal tooth, distolateral tooth acute, distinctly shorter than stylocerite; carpocerite beyond end of antennular peduncle by 1/2 length of third segment; scaphocerite blade much wider, shorter than antennular peduncle, lateral spine with lateral margin slightly concave posteriorly, slightly overreaching end of third segment, shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extend; antepenultimate segment longest; penultimate segment about 1.8 times as long as wide at base; tip of ultimate segment bearing crown of five spine-like setae, with several brush transverse rows of setae along ventral margin.

Merus of major cheliped 3.1 times as long as wide at base, superodistal margin ending in acute triangular tooth; carpus cup-shaped, with long setae distodorsally; chela with palm about 2.8 times as long as dactylus, superior distal margin of palm at most with one obtuse tooth; dactylus distinctly longer than pollex.

Minor chela with merus about 3.5 times as long as wide, longer than that of major cheliped, superodistal margin ending in acute triangular tooth; carpus cup-shaped proportionally longer that of major cheliped; palm about 1.8 times as long as fingers; dactylus as long as pollex, distally slightly curved.

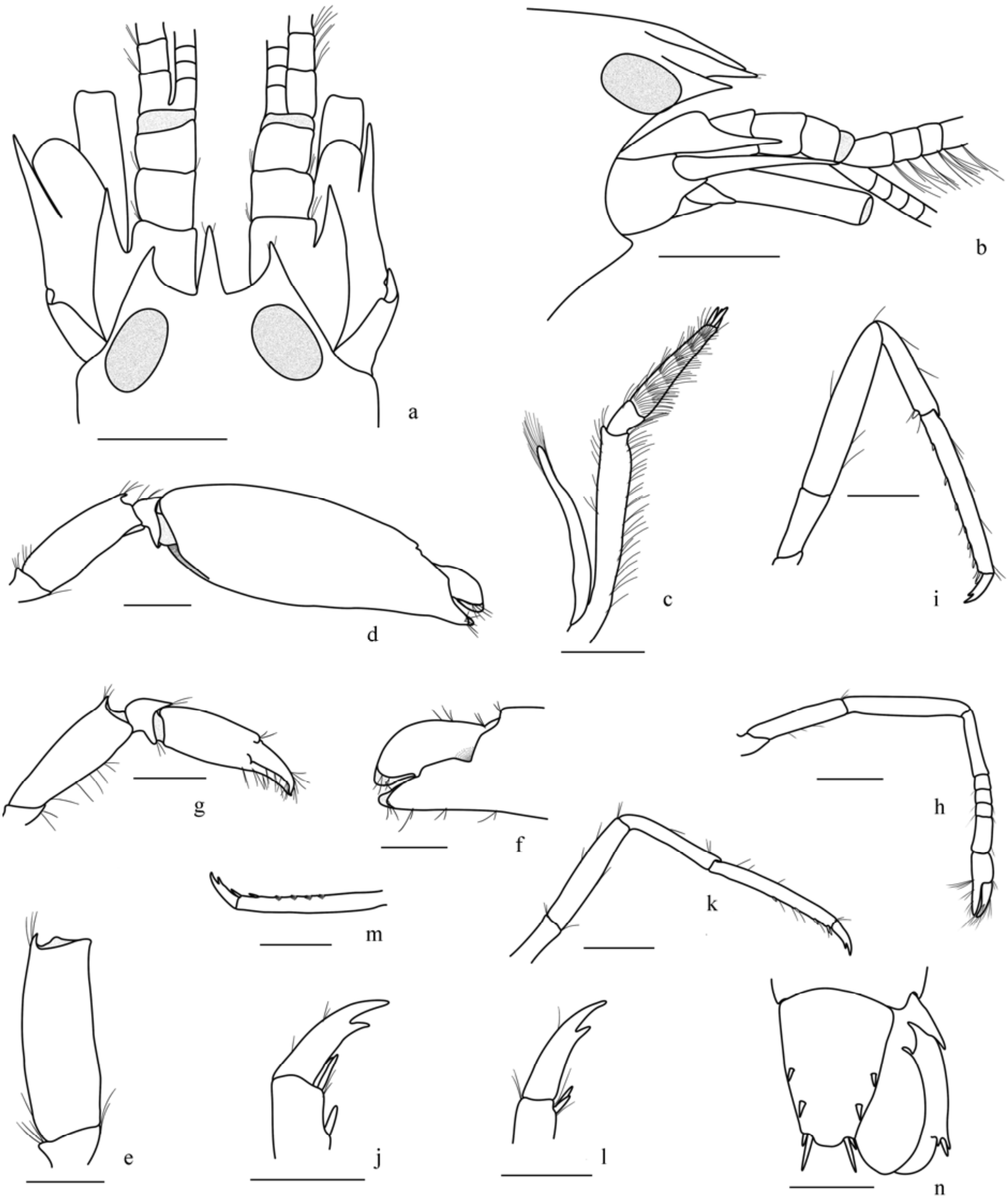

Fig. 2. *Synalpheus biunguiculatus* (Stimpson, 1860), male (cl 2.7 mm). a–b. Frontal region. a. Dorsal. b. Lateral. c. Third maxilliped, ventral. d–f. Major cheliped (left). d. Lateral. e. Merus, lateral. f. Chela, lateral. g. Minor cheliped (right), lateral. h. Second pereiopod, lateral. i–j. Third pereiopod. i. Lateral. j. Distal propodus and dactylus, lateral. k–l. Fourth pereiopod. k. Lateral. l. Distal propodus and dactylus, lateral. m. Fifth pereiopod, propodus and dactylus, ventral. n. Telson and right uropod, dorsal. Scale bars: a–i, k, m–n = 0.5 mm; j, l = 0.25 mm.

Second pereiopod slender, with ischium distinctly shorter than merus; carpus five-segmented, segment ratio subequal to 10 : 2 : 2 : 1.7 : 4.2, with first segment subequal to sum of last four segment; fingers slightly longer than palm. Third pereiopod slender, with merus slightly longer than propodus, about 5.4 times as long as wide at base, without spines on ventral margin; carpus about 1/2 merus length, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with 4–6 spines along ventral margin plus one distal pair of spines near dactylus; dactylus slender, about1/5 propodus length, biunguiculate, flexor tooth distinctly smaller than extensor,1/3 length of extensor tooth and 2/3 width of extensor tooth; notch between extensor and flexor tooth V-shaped. Fourth pereiopod generally similar to third; but ventral margin of carpus without distal spine. Propodus of fifth generally similar to that of fourth and third pereiopod, but with 4–5 transversal rows of spine-like setae and two spines along ventral margin plus one pair of spines near dactylus.

Remarks. This species was originally reported by Stimpson (1860). But its original description was much simple and

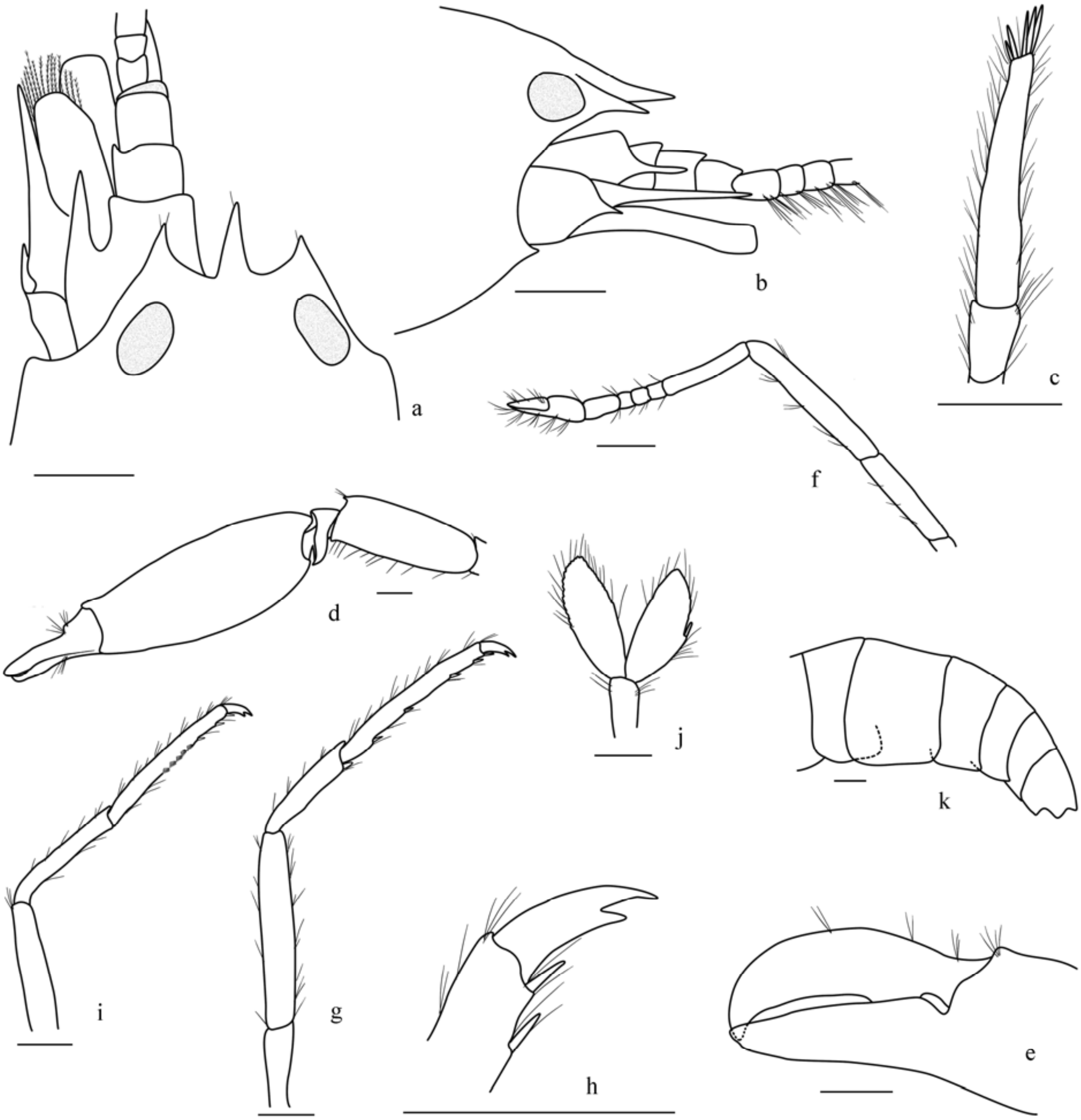

Fig. 3. *Synalpheus biunguiculatus* (Stimpson, 1860), female (cl 2.9 mm) (MBM 157909). a–b. Frontal region. a. Dorsal. b. Lateral. c. Third maxilliped, tip, dorsal. d–e. Major cheliped. d. Mesial. e. Chela, lateral. f. Second pereiopod, lateral. g–h. Third pereiopod. g. Lateral. h. Distal propodus and dactylus, lateral. i. Fifth pereiopod, lateral. j. Second pleopod. k. Abdomen, lateral. Scale bars = 0.5 mm.

without figures to illustrate. Therefore, this species was controversial (Banner, 1953).

The species is generally identified following the redescription of Banner (1953). But our collection has following different characters: the stylocerite not overreaching the end of the second segment of the antennular peduncle; the ventral margin of fifth pereiopod as usual with 4–5 transversal rows of spine-like setae rather than "with no trace of brush"; the anterior pair dorsal spines of the telson inserted about 1/2 length of the telson rather 0.3 length of that. Additionally, one specimen is much different with others in following characters: the merus of the major chela more slender, about 4.6 times as long as wide (Fig. 3d); the fingers of the major chela much longer, slender and a little compressed, with palm about 2.2 time as long as fingers (Figs 3d–e). As species of *Synalpheus* are always variable in these kinds of characters, those differences are taken as variation of the *S. biunguiculatus*.

Distribution. South China Sea; Hanauma Bay, Oahu; Oahu off Waikiki, off Nanakui, Maui off Kalama Park; off Hawaii at Halape.

3.2.4 ***Synalpheus brevrostrus* sp. nov.** (Figs 4–6)

Material examined. Holotype (MBM 283384), ♂, CL 6.5 mm, TL 12.5 mm, Jinqing Island, Xisha Islands (16°27′57″N, 111°44′17″E), 25 April 1958, coll. Zhen-Gang Fan, Jie-Shan Xu. Paratypes: (MBM 283383), 1♀, CL 5.5 mm, TL 15.0 mm, Xisha Islands, 28–29 April 1958, coll. Zhen-Gang Fan, Jie-Shan Xu; (MBM 283384), 1♀, CL 5.6 mm, TL 14.8 mm, Jinqing Island, Xisha Islands (16°27′57″N, 111°44′17″E), 25 April 1958, coll. Zhen-Gang Fan, Jie-Shan Xu.

Description. Carapace smooth, glabrous; rostrum twice as long as wide at base, with lateral margins slightly convex, rounded tip bearing two short setae, hardly reaching 1/2 length of visible part of first segment of antennular peduncle; orbital hoods about 2.7 times as wide at base as rostrum, distinctly longer than rostrum, with rounded tip bearing two short setae; notches between orbital hoods and rostrum deep, narrow, V-shaped; pterygostomial corner produced into blunt acute angle.

Abdominal somites smooth, glabrous, posterolateral margin of sixth pleura with 3–4 small teeth, sex bimorphology, first pleura of male with posterior corner distinctly produced ventrally into anteriorly directed hook; second posterior corner rounded; third-fifth with lower margin produced into acute angle, first pleura of female with posterior corner rounded. Telson about 1.3 times as long as wide at base; lateral margin slightly concave posteriorly; dorsal surface without median groove, with two pairs of large spines, inserted approximately at 1/3 and 2/3 length of telson; posterior margin moderately convex, fringed with long setae, posterolateral angle each with two pairs of spines, lateral 2/3 length of mesial, posterolateral margins each produced into acute tooth, but distinctly shorter than lateral spine.

Eyes concealed in lateral and dorsal view.

Antennular peduncle slender, with distally acute stylocerite, latter overreaching end of first segment of antennular peduncle, about 1/6–1/5 length of second; second segment 1.8 times as long as wide; visible part of first segment slightly longer than second and about twice as long as third. Antenna with basicerite with acute distodorsal tooth, 1/8 length of distolateral tooth, latter hardly reaching end of first segment, distinctly shorter than stylocerite; carpocerite beyond end of antennular peduncle by 1/3 length of third segment; scaphocerite blade narrow, 4/5 length of second segment of antennular peduncle, lateral spine moderately developed, with lateral margin slightly concave posteriorly, almost overreaching end of second segment.

Mouthpart not dissected. Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest, about 5.2 times as long as wide; penultimate segment about 1.7 times as long as wide at base; tip of ultimate segment bearing crown of 5–6 spine-like long setae, with several brush consisting of 6–8 transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus four times as long as wide at base, superodistal margin ending in subacute tooth; carpus cup-shaped, with long setae distodorsally; chela cylindrical, not a bit compressed or twisted, with palm about 2.8 times as long as dactylus, distodorsal tooth of palm subacute, straightforward; dactylus longer than pollex.

Minor chela with ventral margin of ischium bearing long setae; merus about 3.3 times as long as wide, longer than that of major cheliped, superodistal margin rounded, without any projecting, ventral margin bearing row of short setae; carpus cup-shaped proportionally longer that of major cheliped; palm about 2.5 times as long as fingers, lateral face near dactylus bearing patch of stiff setae; dactylus tapering, with flexor margin concave, distal single tooth, lateral margin near palm bearing row of long setae; pollex tapering, with flexor surface obliquely convex, distal single tooth.

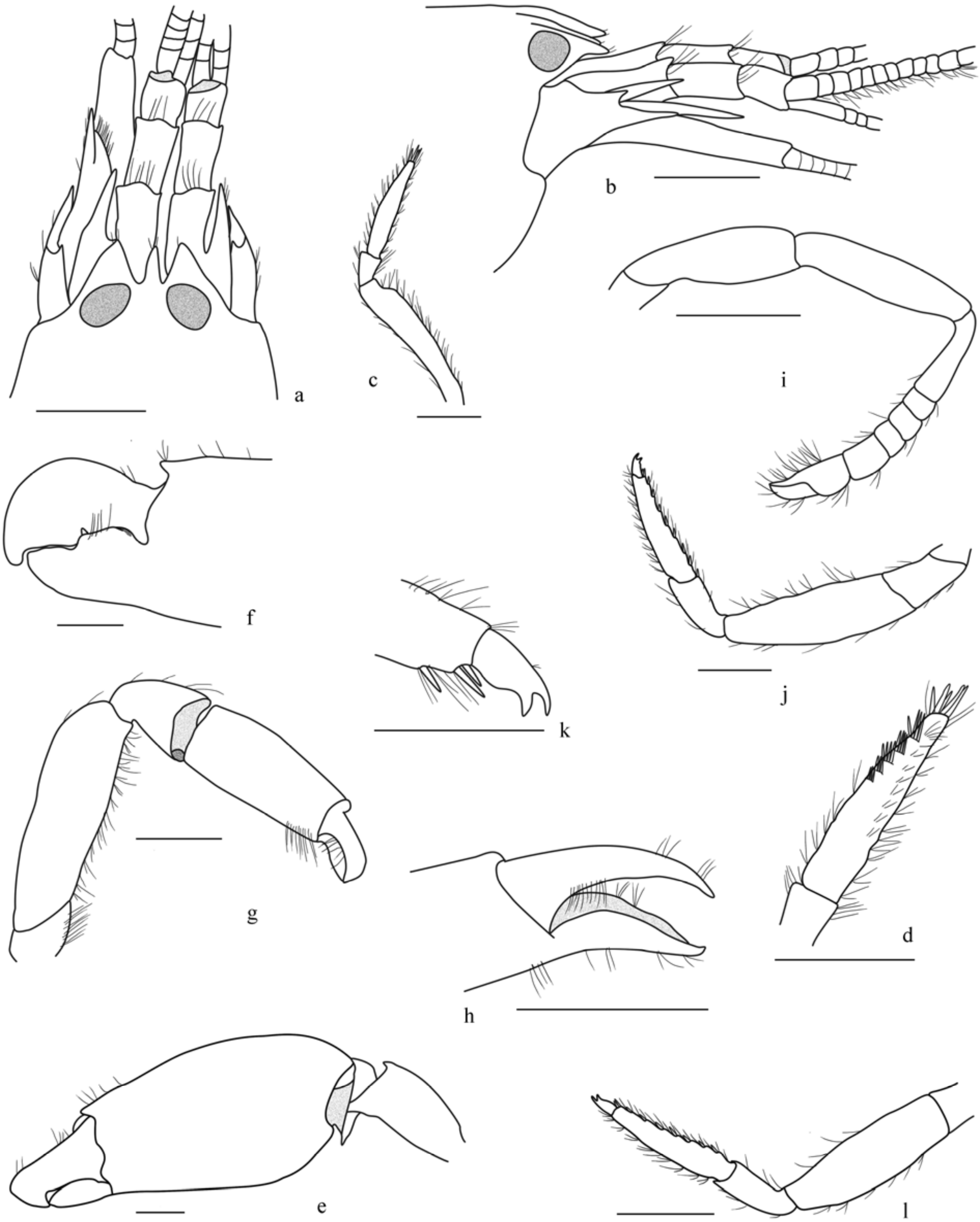

Fig. 4. *Synalpheus brevrostrus* **sp. nov.**, male (tl 12.5 mm) (MBM 284484). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Lateral. d. Tip, lateral. e–f. Major cheliped. e. Mesial. f. Lateral. g–h. Minor cheliped. g. Lateral. h. Chela, mesial. i. Second pereiopod, lateral. j–k. Third pereiopod. j. Lateral. k. Distal propodus and dactylus, lateral. l. Fourth pereiopod, lateral. Scale bars: a–c, e–j, l = 1 mm; d, k = 0.5 mm.

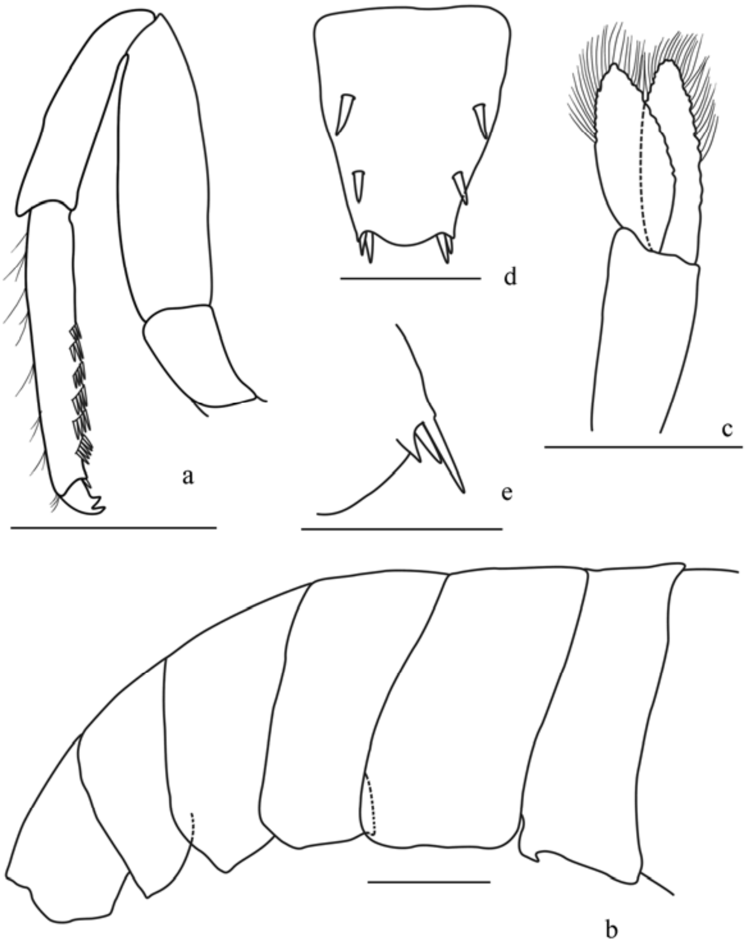

Fig. 5. *Synalpheus brevrostrus* **sp. nov.**, male (tl 12.5 mm) (MBM 284484). a. Fifth pereiopod, distal propodus and dactylus, lateral. b. Abdomen, lateral. c. Second pleopod. d. Telson, dorsal. e. Right uropod, distolateral margin of exopod, dorsal. Scale bars = 1 mm.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 4.3 : 1 : 1 : 1 : 2, with first segment shorter than sum of last four segment, segments 2–4 wider than long; dorsal margin of palm convex; fingers subequal to palm. Third pereiopod stout; merus longer than propodus, about 3.8 times as long as wide at base, without spines on ventral margin; carpus about 1/3 merus length, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with usual seven spines along ventral margin plus one distal pair of spines near dactylus; dactylus around 3/14 propodus length, biunguiculate, moderately slender, ventral margin near to flexor tooth concave, extensor tooth slightly thicker than flexor tooth at base, subequal; notch between extensor and flexor tooth V-shaped. Fourth pereiopod generally similar to third; but ventral margin of carpus without distal spine. Fifth pereiopod with merus about three times as long as wide; carpus about 5/7 merus length, ventral margin without distal spine; propodus as long as merus, with six transversal rows of setae along ventral margin plus one pair of spines near dactylus.

Etymology. “*brev*” means short, “*rostrus*” means the rostrum. The specific name is referring to the rostrum distinctly shorter than the orbital hoods.

Type locality. Jinqing Island, Xisha Islands, South China Sea.

Distribution. Xisha Islands, presently known only from the type locality in South China Sea.

Remarks. *Synalpheus brevrostrus* **sp. nov.** can be easily distinguished from other species by the following: the deep, narrow notches between rostrum and orbital hoods; the rostrum distinctly shorter than the orbital hoods and distinctly lower than the orbital hoods in lateral view; the reduced scaphocerite blade and lateral spine. It is morphologically similar to *S. readi* and *S. quadrispinosus*, but can be distinguished by the characters summarized in Table 1.

Table 1. Comparision of *Synalpheus brevrostrus* sp. nov. and its similar species.

Species characters	*S. readi*	*S. quadrispinosus*	*S. brevrostrus* **sp. nov.**
Rostrum compared to orbital hoods	Equal, tips of both upturned	Subequal, tips not upturned	Former shorter than latter
Rostrum length relative to visible part of first segment of antennular peduncle	End	1/2 length	1/2 length
Stylocerite compared to distolateral tooth of basicerite	Former longer than latter	Subequal	Former longer than latter
Lateral spine of scaphocerite compared to segment of antennular peduncle	End of third	Around end of third	End of second
Superodistal tooth on palm of large cheliped	Subacute, strongly upturned	Small rounded tooth, not upturned	Subacute, straight forward
Superodistal margin of merus, large cheliped	Rounded, without any projecting	Rounded, without any projecting	Subacute triangular tooth
Distal of dactylus, minor chela	Two acute teeth	Single tooth	Single tooth
Notch between extensor and flexor tooth of third pereiopod	U-shaped	V-shaped	V-shaped

In addition, one paratype has slight differences with another two types by following characters: notches between rostrum and orbital hoods U-shaped rather than V-shaped (Fig. 6a); distolateral tooth of basicerite distinctly longer than stylocerite and overreaching middle of second segment of antennular peduncle rather shorter than latter; scaphocerite blade overreaching middle of third segment rather than 4/5 length of second; lateral spine of scaphocerite far beyond antennular peduncle by the length of third segment rather than almost overreaching second; superodistal margin on palm of large

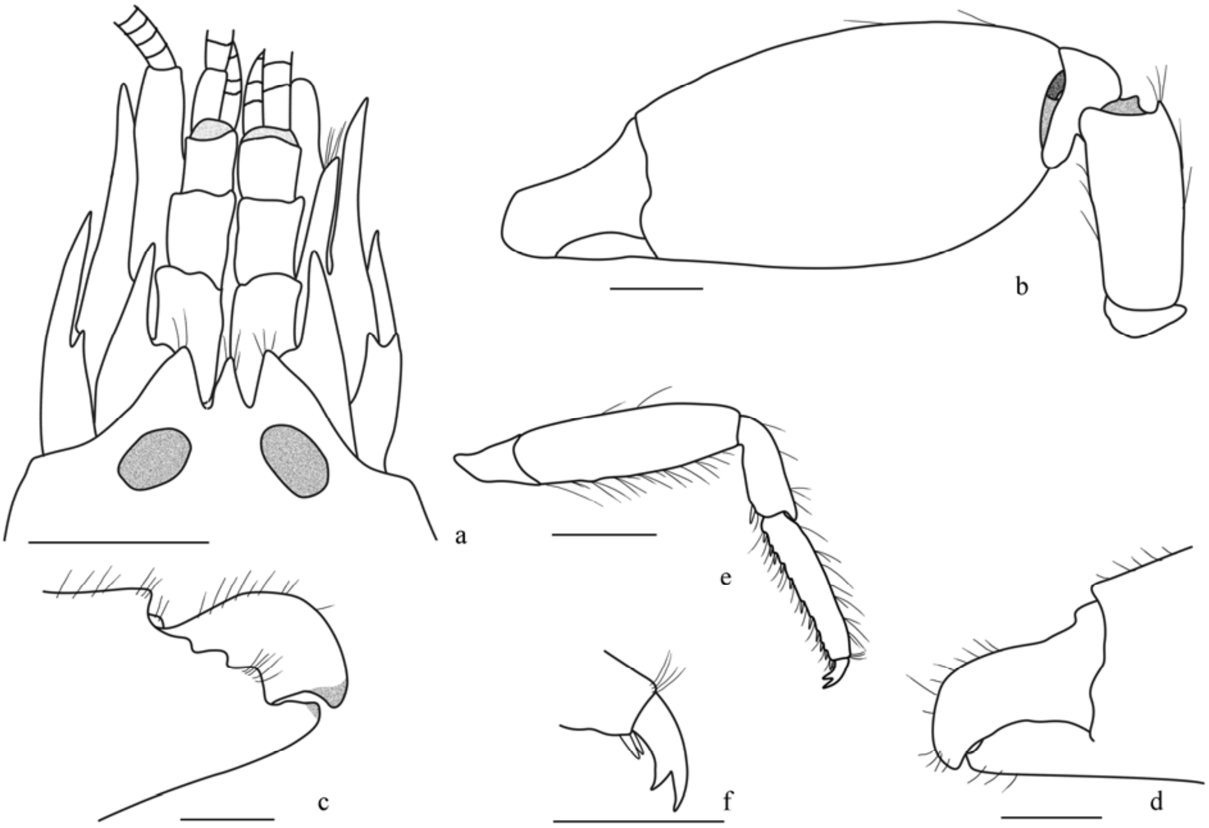

Fig. 6. Synalpheus *brevrostrus* **sp. nov.**, female (tl 14.8 mm) (MBM 284484). a. Frontal region, dorsal. b–d. Major cheliped. b. Mesial. c. Chela, lateral. d. Chela, mesial. e–f. Third pereiopod. e. Lateral. f. Distal propodus and dactylus. Scale bars: a–e = 1 mm; f = 0.5 mm.

cheliped rounded, without distinctly projecting rather than with an subacute, straightforward tooth (Figs 6b–d); propodus of third pereiopod with ten spines along ventral margin rather than usual seven spines (Fig. 6e); extensor tooth of third pereiopod distinctly longer than the flexor tooth rather than subequal to latter (Fig. 6f). However, as only one specimen is present such characters, and those characters are always variable in this genus, it is tentatively put into the new species.

3.2.5 *Synalpheus carinatus* (de Man, 1888) (Figs 7–8)

Alpheus carinatus de Man, 1888. *Arch. Naturgesch*., 53(1): 508, pl. 22, fig. 2.

Synalpheus carinatus de Man, 1911. *Siboga Exped.*, 39(2): 210, pl. 6, fig. 23; Banner & Banner, 1968. *Micronesica*, 4 (2): 272.

Svnalpheus carinatus var. binongcensis de Man, 1909. *Tijdschr. ned. dierk. Vereen.* II, 11(2): 111; 1911. *Siboga Exped.*, 39(2): 211, pl. 6, fig. 23a.

Svnalpheus carinatus var. *ubianensis* de Man, 1909. *Tijdschr. ned. dierk. Vereen.* II, 11(2): 111; 1911. *Siboga Exped*., 39(2): 212.

nec *Synalpheus carinatus* Pearson, 1905. *Rep. Pearl Oyst. Fish., Ceylon*: 83, pl. 2, figs 9 (= *S. trispinosus* de Man).

Material examined. (MBM158008), 1♀, 1♂, CL 7.1 mm, TL 12.5 mm, Yongxing Island, Xisha Islands (16.8°N, 112.3°E), 15 April 1957.

Description. Carapace smooth, glabrous; rostrum depressed, slightly concave in lateral view, acute tip reaching middle of second segment of antennular peduncle; rostrum and carapace bearing strong median carina, extending almost entire length of carapace; orbital hoods half-length of rostrum, with rounded tip bearing two short setae; pterygostomial corner produced into blunt acute angle; cardiac notch well developed.

Telson about 1.5 times as long as wide at base; dorsal surface with two pairs of moderately large spines, inserted approximately at 3/5 and 4/5 length of telson; posterior margin moderately produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/2 length of mesial, posterolateral margins not produced.

Eyes concealed in lateral and dorsal view.

Antennular peduncle moderately stout, with distally acute stylocerite, latter reaching 1/3 length of second segment of antennular peduncle; second segment about 1.5 times as long as wide; visible part of first segment longer than second and about twice as long as third. Basicerite with acute distodorsal tooth, distolateral tooth reaching about 2/3 length of visible part of first segment of antennular, distinctly shorter than stylocerite; carpocerite beyond end of antennular peduncle by 1/3 length of third segment; scaphocerite blade narrow, reaching end of third segment of antennular peduncle, lateral spine developed, distally curved inward, overreaching end of antennular peduncle, shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest, about twice as long as ultimate segment; penultimate segment about 2.5 times as long as wide at base; tip of ultimate segment bearing crown of four spine-like setae, with transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus about 3.5 times as long as wide at base, superodistal margin with acute triangular tooth; carpus cup-shaped, with setae distodorsally; chela slightly compressed, with palm about 1.8 times as long as dactylus, distodorsal of palm without any projecting; dactylus as long as than pollex, distally slightly curved.

Minor chela with merus about 4.8 times as long as wide at base, superodistal margin with acute triangular tooth, ventral margin bearing short setae; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.5 times as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 4: 1: 1: 1: 2, with first segment slightly shorter than sum of last four segment; dorsal margin of palm convex; fingers about 1.25 times as long as palm. Third pereiopod stout; merus shorter than propodus, about 4 times as long as wide at base; carpus about 1/2 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with six spines along ventral margin plus one distal pair of spines near dactylus; dactylus strongly curved, at right angles to propodus, biunguiculate, extensor tooth about twice as long as flexor tooth, notch between extensor and flexor tooth V-shaped. Fourth pereiopod generally similar to third; ventral margin of propodus with four spines. Fifth pereiopod similar to third and fourth pereiopod, propodus with distally two transversal rows of setae and two spines on ventral margin.

Remarks. *Synalpheus carinatus* was original described by de Man (1888), and redescribed by him (1911) with another two varieties (*S. carinatus* var. *binongcensis* de Man, 1909; *S. carinatus* var. *ubianensis* de Man, 1909). Banner (1958) and Banner & Banner (1968, 1975) have given excellent discussions about the variations in this species.

The present two specimens, collected from Xisha Islands, South China Sea, are obvious *S. carinatus*. But they are not well agreed with the redescription of Banner & Banner (1975) by following: the stylocerite reaching just 1/3 length rather than middle of second segment of the antennular peduncle; the distolateral tooth of the basicerite distinctly shorter than the

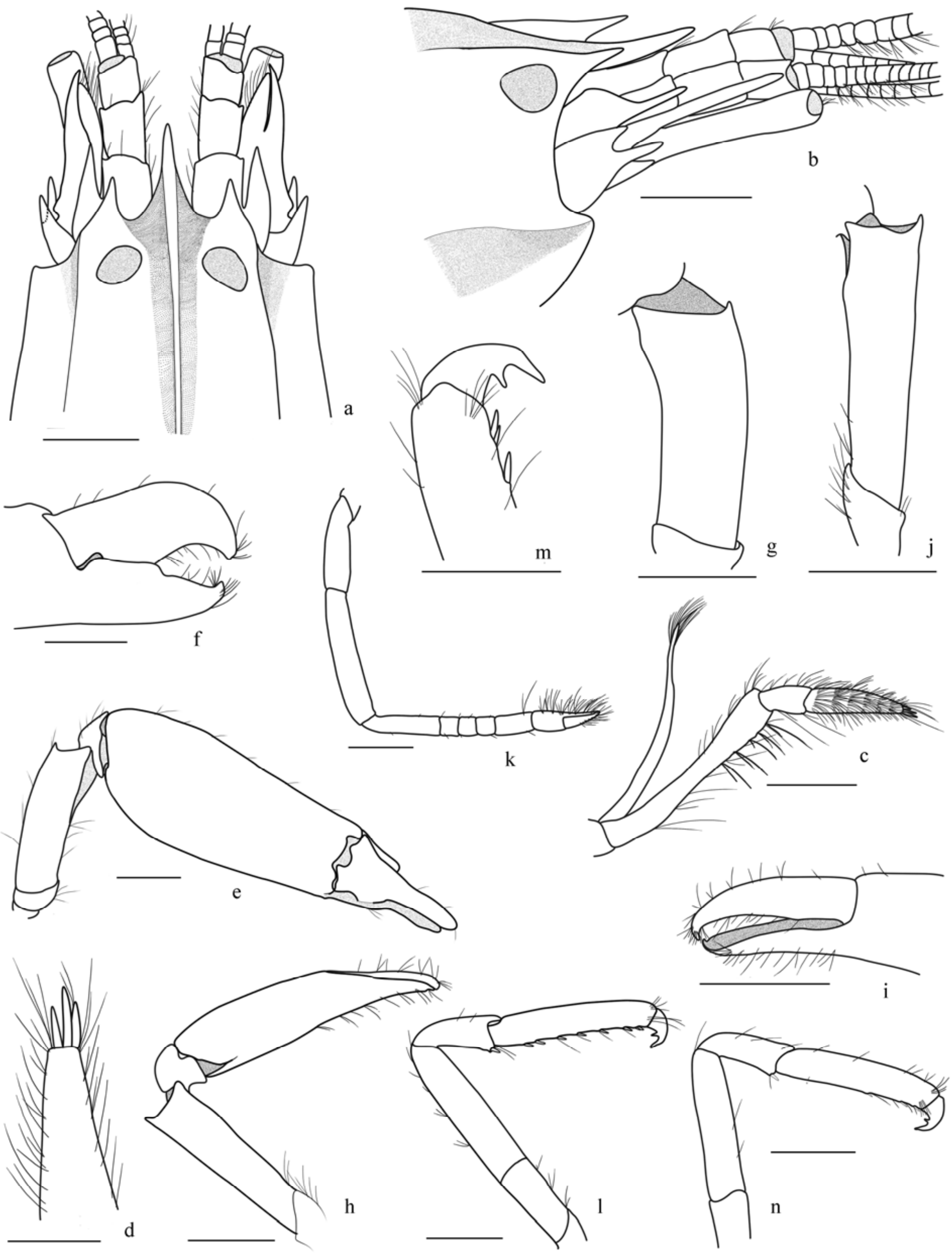

Fig. 7. *Synalpheus carinatus* (de Man, 1888), female (cl 7.1 mm) (MBM 158008). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Ventral. d. Tip, dorsal. e–g. Major cheliped (right). e. Mesial. f. Chela, lateral. g. Merus, lateral. h–j. Minor cheliped (left). h. Lateral. i. Chela, mesial. j. Merus, lateral. k. Second pereiopod, lateral. l–m. Third pereiopod. l. Lateral. m. Distal propodus and dactylus, lateral. n. Fourth pereiopod, lateral. Scale bars: a–c, e–k, n = 1 mm; d, m = 0.5 mm.

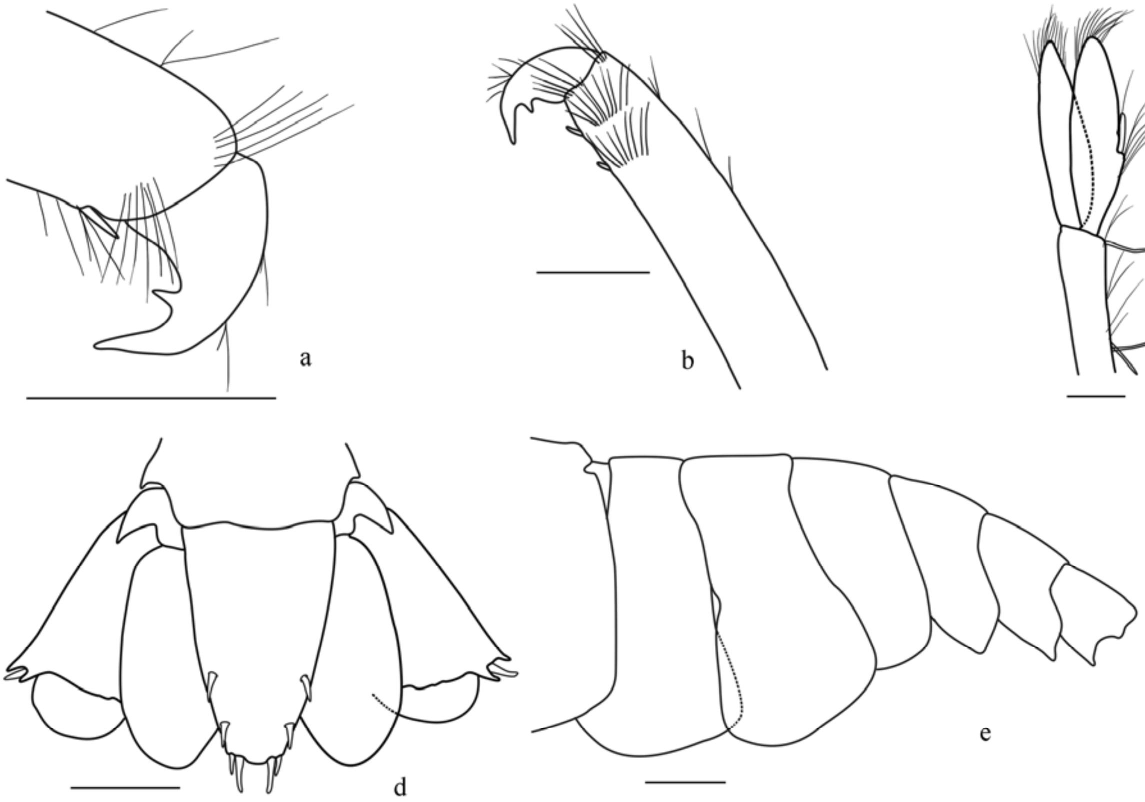

Fig. 8. *Synalpheus carinatus* (de Man, 1888), female (cl 7.1 mm) (MBM 158008). a. Fourth pereiopod, distal propodus and dactylus, lateral. b. Fifth pereiopod, propodus and dactylus, lateral. c. Second pleopod. d. Telson and uropod, dorsal. e. Abdomen, lateral. Scale bars: a–c = 0.5 mm; d–e = 1 mm.

stylocerite rather than subequal; the carpus of the major and minor chela normal in form, not bearing acute teeth either in superior or inferior margin; the merus of major and minor margin slender than normal species in this genus, but the inferointernal margin not bearing acute teeth; the ventral margin of the propodus in third pereiopods bearing only 6 spines, less than 12–14 spines.

Distribution. South China Sea; Indonesia; Malaysian Archipelago; Caroline; Marshall; Gilbert Islands.

3.2.6 *Synalpheus charon* (Heller, 1861) (Figs 9–10)

Alpheus charon Heller, 1861. *Sbr. Akad. Wiss. Wien*, 44(1): 272, pl. 3. fig. 21, 22; 1865. *Reise Novara Crust.*, 2 (3): 107; Paulson, 1874. *Invest. Red Sea Crust.*, 1: 104, pl. 8, fig. 4.

Synalpheus charon de Man, 1911. *Siboga Fxped.*, 39(2): 245, figs 37; Banner, 1953. *Pacif. Sci.*, 7(1): 37, fig. 11; Banner & Banner, 1967. *Bishop Mus. Oec. Pap.*, 23(12): 262; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 369, fig. 25.

Synalpheus charon charon Banner, 1956. *Pacif. Sci.*, 10(3): 331.

Synalpheus charon obscurus Banner, 1956. *Pacif. Sci.*, 10(3): 329. fig. 5.

Synalpheus prolificus Spence Bate, 1888. *Challenger Rept.*, 24: 556, pl. 99, fig. 4.

Synalpheus helleri de Man, 1911. *Siboga Exped.*, 39(2): 245, fig. 37.

Material examined. CL 4.1–5.3 mm, TL 10.2–14.1 mm. (MBM 233243), 1♂, Dong Island, Xisha Islands, Sta. 3, 10 June 1975; (MBM 107741), 1 ovigerous ♀, 1♂, Yongxing Island, Xisha Islands, 11–13 June 1980, coll. Xiu-Bin Fang; (MBM 107650), 1 ovigerous ♀, 1♂, Jinqing Island, Xisha Islands, 25 April 1958, coll. Zhen-Gang Fan, Jie-Shan Xu; (MBM 107755), 1♂, Yongxing Island, Xisha Islands, 11–13 June 1980, coll. Xiu-Bin Fang; (MBM 107736), 1♂, Jinyin Island, Xisha Islands, 14 May 1980, coll. Xiu-Bin Fang; (MBM 107743), 2 ovigerous ♀, 2♂, Zhaoshu Island, Xisha Islands, 11 May 1980, coll. Xiu-Bin Fang; (MBM 107724), 1♂, 1 immature specimens, Shi Island, Xisha Islands, 10 May 1980, coll. Xiu-Bin Fang; (MBM 107223), 1 ovigerous ♀, 1♂, Sanya, Dadonghai, depth 5–9 m, 3 December 1997, coll.

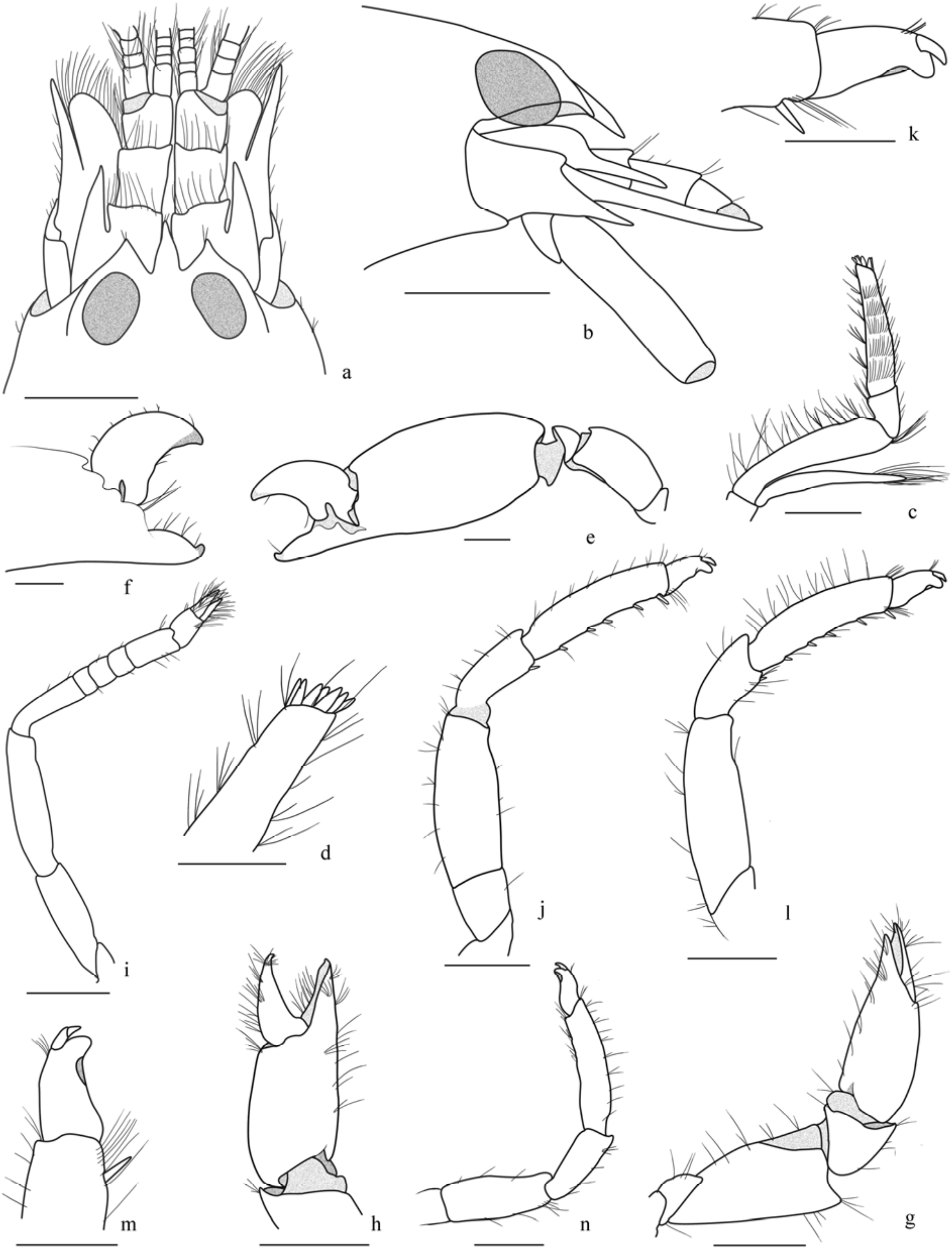

Fig. 9. *Synalpheus charon* (Heller, 1861), female (cl 4.9 mm) (MBM 107743). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Ventral. d. Tip, dorsal. e–f. Major cheliped (left). e. Lateral. f. Chela, lateral. g–h. Minor cheliped (right). g. Lateral. h. Chela, lateral. i. Second pereiopod, lateral. j. Third pereiopod, lateral. k. Distal propodus and dactylus, lateral. l–m. Fourth pereiopod. l. Lateral. m. Distal propodus and dactylus, lateral. n. Fifth pereiopod, lateral. Scale bars: a–c, e–j, l, n = 1 mm; d, k, m = 0.5 mm.

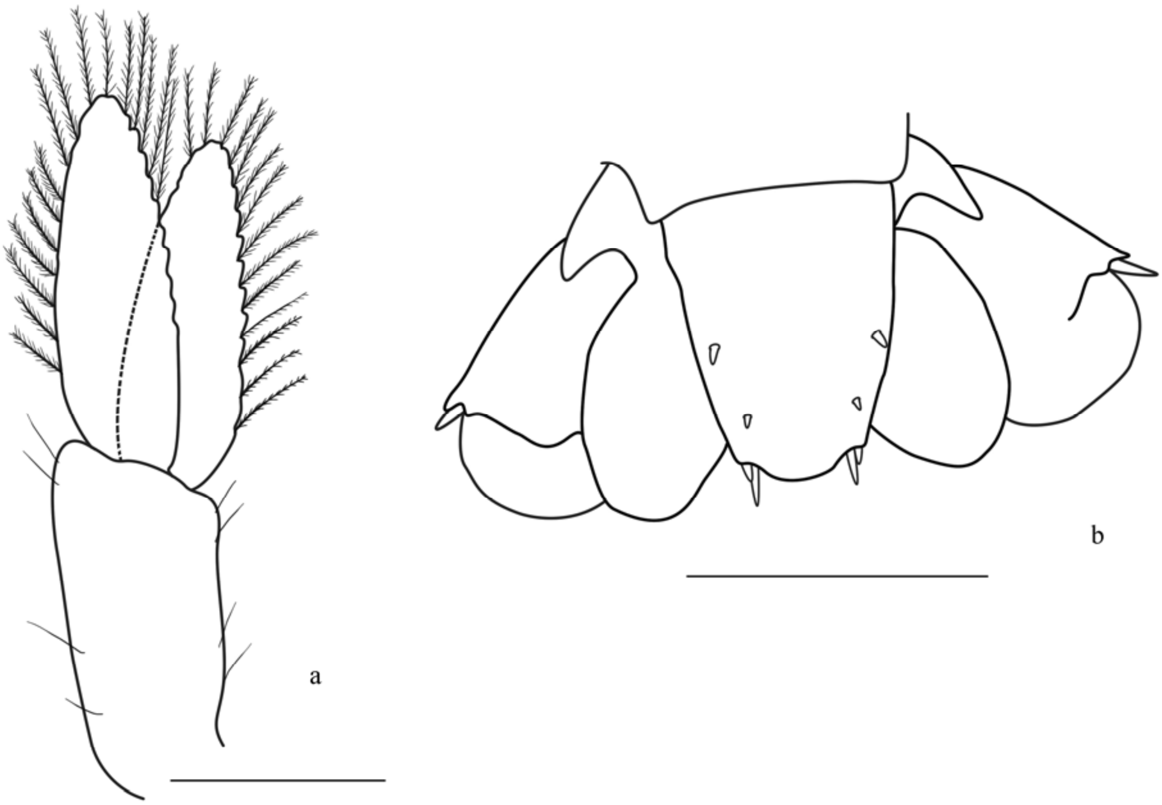

Fig. 10. *Synalpheus charon* (Heller, 1861), female (cl 4.9 mm) (MBM 107743). a. Second pleopod. b. Telson and uropod, dorsal. Scale bars = 1 mm.

Xin-Zheng Li; (MBM 158865), 1♂, Nansha Islands, 22 April 1987; (MBM 158746), 1♂; (MBM 158434), 1♂, Yezhu Island N-side, 22 March 1992; (MBM 158033), 1 ovigerous ♀, 28–29 April 1958, coll. Zhen-Gang Fan, Jie-Shan Xu; (MBM 157745), 4 ovigerous ♀, 9♂; (MBM 158071), 1 ovigerous ♀, Dengqing island, 3 May 1958, coll. Zhen-Gang Fan, Jie-Shan Xu; (MBM 157986), 1♂, Dengqing island, 3 May 1958, coll. Zhen-Gang Fan, Jie-Shan Xu.

Description. Carapace smooth, glabrous; rostrum about twice as long as wide at base, triangular tip not reaching end of first segment of antennular peduncle; orbital hoods distinctly shorter than rostrum, about twice as wide at base as rostrum; pterygostomial corner produced into acute angle; cardiac notch well developed.

Telson about 1.25 times as long as wide at base; dorsal surface with two pairs of moderately small spines, inserted approximately at 1/2 and 3/4 length of telson; posterior margin strongly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/3 length of mesial, posterolateral margins each not produced.

Eyes concealed in dorsal view, but exposed in lateral view.

Antennular peduncle slender, with distally acute stylocerite, latter reaching 2/3 length of second segment of antennular peduncle; second segment about 1.25 times as long as wide at base; visible part of first segment slightly longer than second and less twice as long as third. Basicerite without distodorsal tooth, distolateral tooth distinctly shorter than stylocerite, overreaching end of first segment of antennular peduncle; carpocerite far overreaching end of third segment of antennular peduncle; scaphocerite blade moderately broad, overreaching end of third segment of antennular peduncle, lateral spine developed, overreaching end of antennular peduncle, distinctly longer than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about less twice as long as wide at base; tip of ultimate segment bearing crown of short six spine-like setae, with transverse rows of long setae along ventral margin.

Major cheliped with short, stout ischium; merus about 2.4 times as long as wide at base, superodistal margin with one subacute triangular tooth; carpus cup-shaped, with setae distodorsally; palm about 1.7 times as long as dactylus, distodorsal of palm with one small obtuse projecting; dactylus slightly longer than pollex.

Minor chela with merus about 3 times as long as wide at base, superodistal margin with one subacute triangular tooth; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.3 times as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 5 : 1 : 1.2 : 1.3 : 2.3, with first segment slightly shorter than sum of last four segment; dorsal margin of palm convex; fingers slightly longer than palm. Third pereiopod moderately stout; merus near as long as propodus, about 3 times as long as wide at base; carpus about 1/2 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with five spines along ventral margin plus one; dactylus about 3/10 length of propodus, slightly curved to propodus, biunguiculate, extensor tooth with acute tip, near as long as flexor tooth, flexor tooth much wider at base than extensor tooth, inferior margin of flexor tooth with excavate “pocket”. Fourth pereiopod generally similar to third; merus near as long as propodus, ventral margin of propodus with five spines. Fifth pereiopod similar to third and fourth pereiopods, ventral margin of carpus without one distal spine; ventral margin of propodus with distal three spines.

Remarks. This species was originally described by Heller. It could be easily recognized by the dactylus of the posterior three pereiopods (Banner & Banner, 1975).

The present specimens is generally agreed with the redescriptions of Miya (1972) and Banner & Banner (1975), and also variable in size and shape of the rostrum (Banner & Banner, 1967).

Distribution. South China Sea; Suez Canal and eastern Africa to Philippines, Indonesia, Australia, and most of Pacific islands, but not including Japan, Hawaii, or Society Islands.

3.2.7 *Synalpheus coutierei* Banner, 1953 (Figs 11–13)

Synalpheus coutierei Banner, 1953. *Pacif. Sci.*, 7(1): 36; Banner & Banner. 1966. *Siam Soc. Mono.*, 3: 62, fig. 20; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 343, fig. 18a–i.

Alpheus biunguiculatus de Man, 1888. *Arch. Naturgesch.*, 53(1): 502, pl. 21, fig. 6; Spence Bate, 1888. *Challenger Rept.*, 24: 562, pl. 101, fig. 4.

Synalpheus biunguiculatus Coutière, 1898. *Bull. Soc. Ent. Fr.*, 1898 (11): 232, figs 1–4 (Arafura Sea, N. W. Australia); 1905. *Fauna and Geog. Maid, and Laccad.*, 2(4): 873, pl. 71, fig. 8.

Synalpheus biunguiculatus var. *exilipes* Coutière, 1905. *Fauna and Geog. Maid, and Laccad.*, 2(4): 874, fig. 10; Balss, 1921. *K. Svenska Vetensk. Akad. Handl.*, 61(10): 9 (Cape Jaubert).

Synalpheus exilipes Johnson, 1962. *Bull. natn. Mus. St. Singapore*, 30: 51.

nec. *Synalpheus biunguiculatus* (Stimpson), 1861. *Proc. Acad. nat. Sci. Philad.*, 1860: 31: 51.

Material examined. (MBM 158469), 1♂, CL 8.2 mm, TL 21.3 mm; (MBM 157752), 1♂, CL 5.1 mm, TL 12.1 mm, 13 May 1958; (MBM 107754), 2♀, 1♂, CL 5.8 mm, TL 15.9 mm, CL 4,6 mm, TL 12.1 mm, Xisha Islands, 19–21 May 1980, coll. Xiu-Bin Fang; (MBM 107767), 1♀, CL 5.7 mm, TL 15.1 mm, Xisha Islands, 14 April 1975, coll. Xin-Zheng Li; (MBM 158838), 1♀, 1♂, CL 6.0 mm, TL 14.9 mm, CL 5.3 mm, TL 12.8 mm, Xinying, 28 July 1957; (MBM 107763), 1♂, CL 4.7 mm, TL 10.5 mm, Lelong, 25 November 1990; (MBM 107761), 1♂, CL 4.8 mm, TL 10.8 mm, Zhaoshu Island, Xisha Islands, 11 May 1980; (MBM 107771), 1♀, 1♂, CL 8.3 mm, TL 21.1 mm, CL 7.2 mm, TL 16.5 mm, Yalong Bay, Yezhu Island N-coast, depth 8 m, from dead coral, 27 March 1992, coll. Newmann; (MBM158006), 2♀, 1♂, CL 5.7 mm, TL 13.2 mm, CL 4.5 mm, TL 10.3 mm; (MBM 158184), 1♂, CL 5.1 mm, TL 11.3 mm, Yongxing Island, Xisha Islands, 12–13 June 1958.

Description. Carapace smooth, glabrous; rostrum twice as long as wide at base, with lateral margins slightly convex, rounded tip bearing two short setae, reaching 1/2 length of visible part of first segment of antennular peduncle; orbital hoods three times as wide at base as rostrum, subequal to rostrum, with rounded tip bearing two short setae, notches between orbital hoods and rostrum V-shaped; pterygostomial corner produced into blunt acute angle; cardiac notch well developed.

Abdominal somites smooth, glabrous. Telson about 1.3 times as long as wide at base; lateral margin slightly concave posteriorly; dorsal surface with median groove, with two pairs of large spines, inserted approximately at 1/5 and 1/2 length of telson; posterior margin strongly convex, fringed with long setae, posterolateral angle each with two pairs of spines, lateral 1/2 length of mesial, posterolateral corner right angle.

Eyes concealed in lateral and dorsal view.

Antennular peduncle with distally acute stylocerite, latter reaching 1/3–1/2 of second segment of antennular peduncle; second segment 1.5 as long as wide; visible part of first segment longer than second and about twice as long as third.

Antenna with basicerite with acute distodorsal tooth, 1/4–1/3 length of distolateral tooth, latter subequal to stylocerite; carpocerite beyond end of antennular peduncle by length of third segment; scaphocerite blade narrow, overreaching second segment of antennular peduncle, lateral spine with lateral margin slightly concave posteriorly, overreaching end of third segment, shorter than carpocerite.

Mouthpart not dissected. Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest, about six times as long as wide; penultimate segment about 1.8 times as long as wide at base; tip of ultimate segment bearing crown of 5–6 spine-like setae, with several brush consisting of 6–8 transverse rows

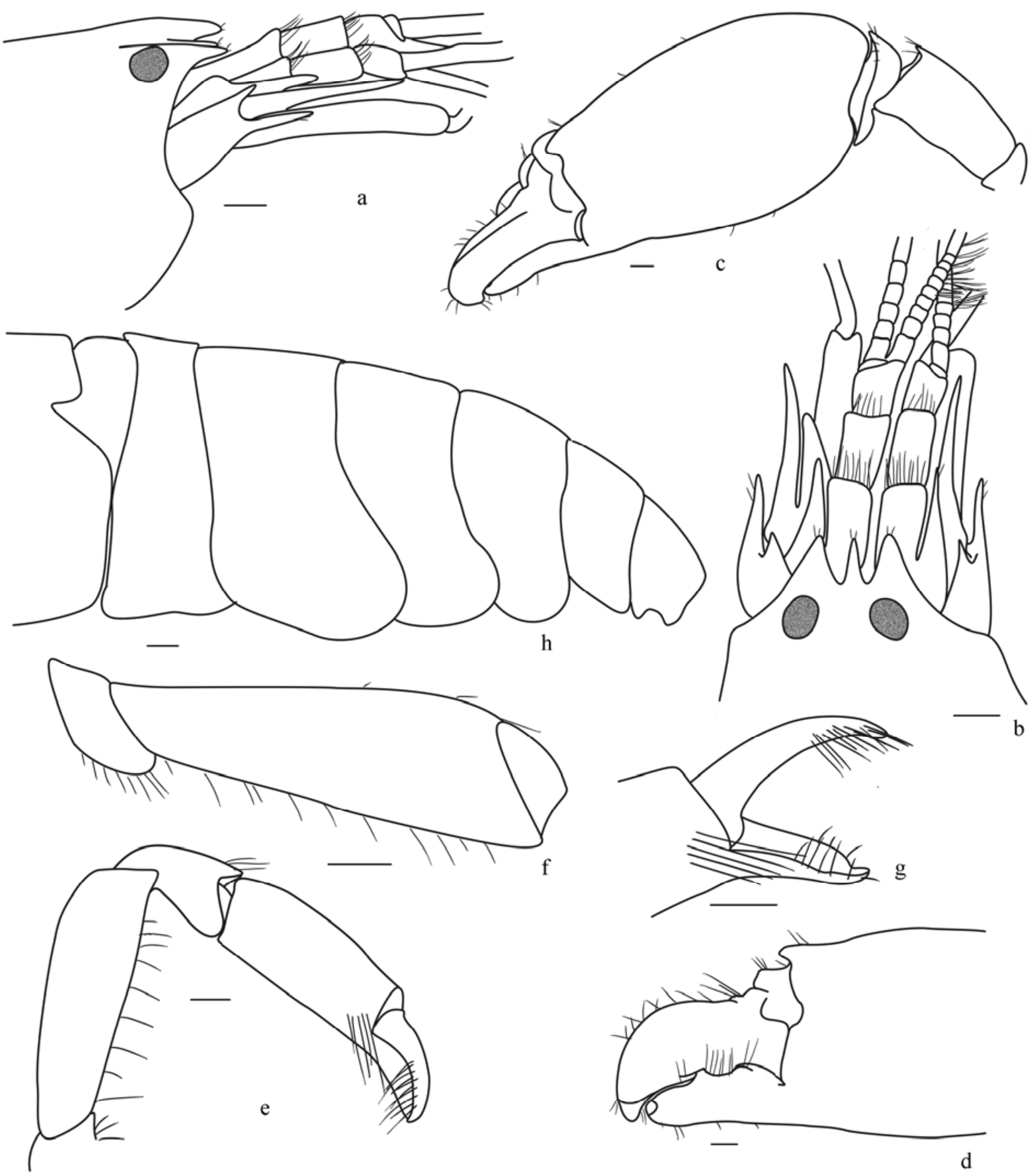

Fig. 11. *Synalpheus coutierei* Banner, 1953, female (cl 8.1 mm) (MBM 158469). a–b. Frontal region. a. Lateral. b. Dorsal. c–d. Major cheliped. c. Mesial. d. Chela, mesial. e–g. Minor cheliped. e. Mesial. f. Merus, mesial. g. Chela, lateral. h. Abdomen. Scale bars = 0.5 mm.

of setae along ventral margin.

Major cheliped with short, stout ischium; merus three times as long as wide at base, superodistal margin ending in subacute triangular tooth; carpus cup-shaped, with long setae distodorsally; chela cylindrical, not a bit compressed or twisted, with palm about 2.5 times as long as dactylus, distodorsal tooth palm subacute, slightly upturned; dactylus distinctly longer than pollex.

Minor chela with ventral margin of ischium bearing long setae; merus about 3.5 times as long as wide, longer than that of major cheliped, superodistal margin rounded, without any projecting, ventral margin bearing row of short setae; carpus cup-shaped proportionally longer that of major cheliped; palm about 1.9 times as long as fingers, lateral face near dactylus bearing patch of stiff setae; dactylus tapering, with flexor margin concave, distal single tooth, lateral margin bearing row of long setae; pollex tapering, with flexor surface obliquely convex, distal single tooth, lateral margin bearing row of long setae.

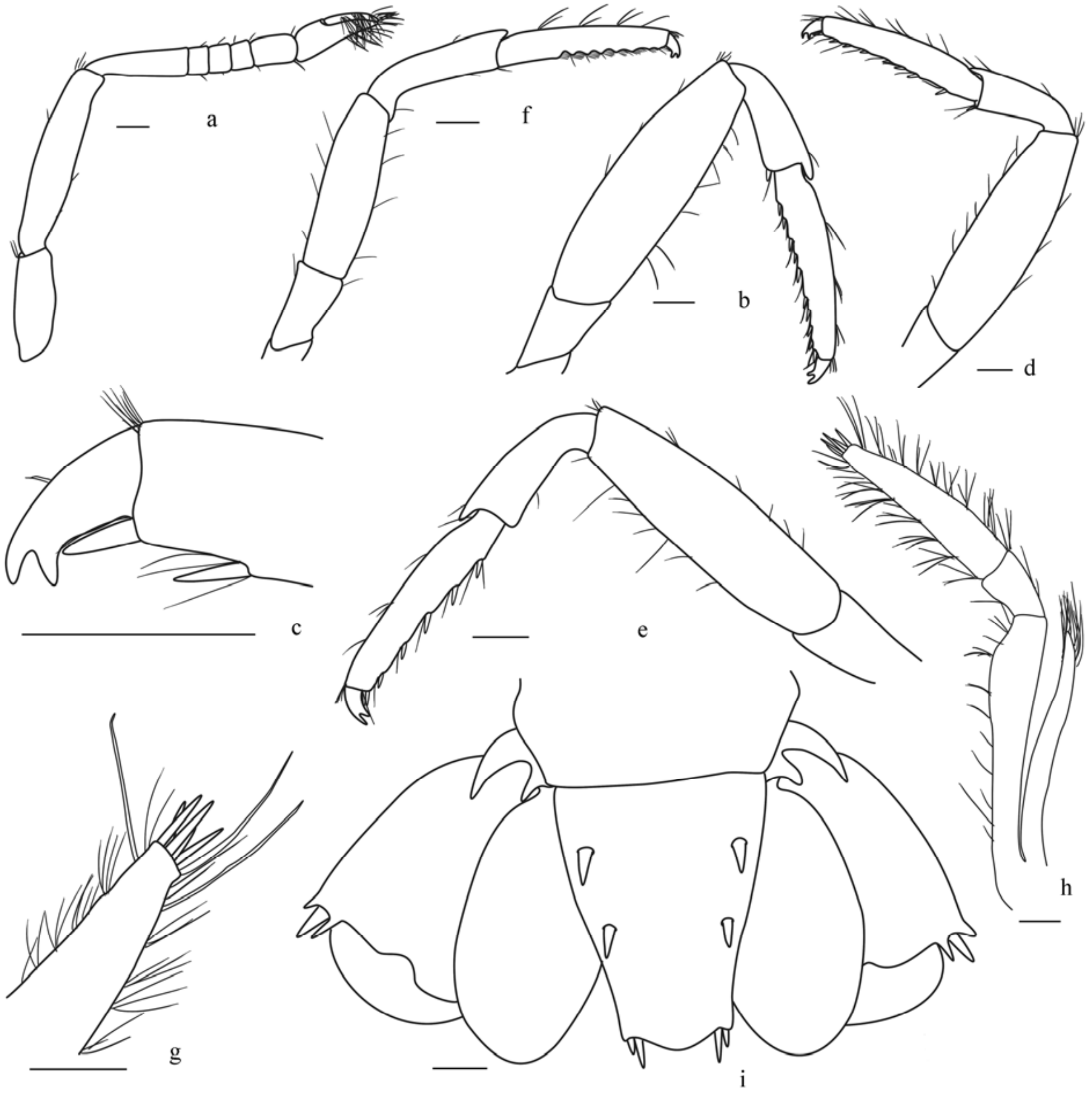

Fig. 12. *Synalpheus coutierei* Banner, 1953, female (cl 8.1 mm) (MBM 158469). a. Second pereiopod, lateral. b–c. Third pereiopod. b. Lateral. c. Distal propodus and dactylus, lateral. d–e. Forth pereiopod, lateral. f. Fifth pereiopod, lateral. g–h. Third maxilliped. g. Tip, dorsal. h. Dorsal. i. Telson and uropod, dorsal. Scale bars = 0.5 mm.

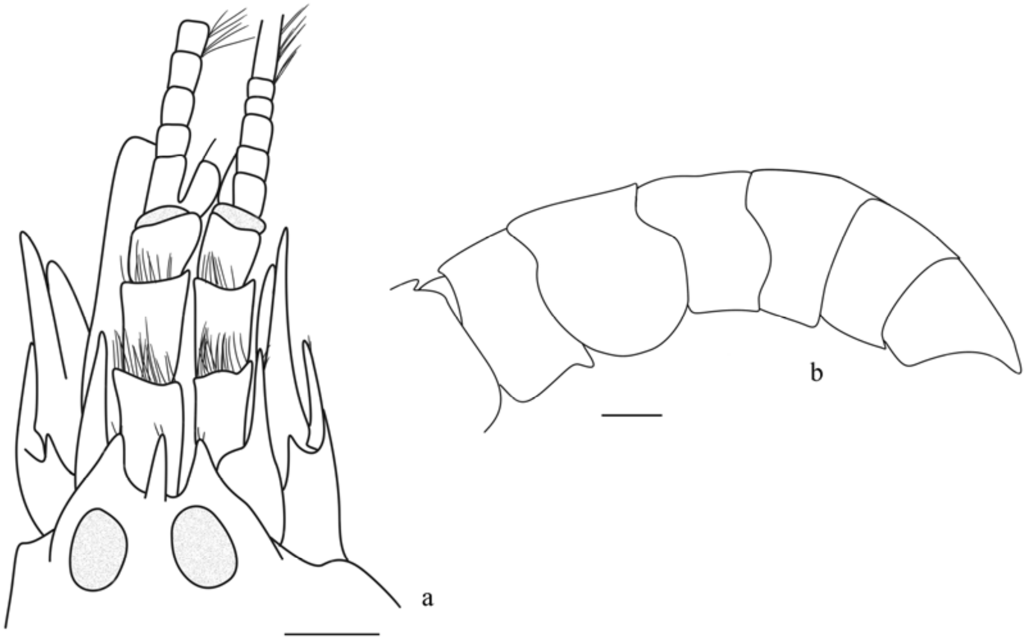

Fig. 13. *Synalpheus coutierei* Banner, 1953, male (cl 5.8 mm) (MBM 107754). a. Frontal region, dorsal. b. Abdomen. Scale bars = 0.5 mm.

Second pereiopod with ischium distinctly shorter than merus; carpus five-segmented, segment ratio subequal to 4 : 1 : 1 : 1 : 2, with first segment shorter than sum of last four segment, segments 2–4 slightly wider than long; fingers 1.5 times as long as palm. Third pereiopod with merus longer than propodus, about four times as long as wide at base, without spines on ventral margin; carpus about 1/3 merus length, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with seven spines along ventral margin plus one distal pair of spines near dactylus; dactylus around 1/6 propodus length, biunguiculate, moderately slender, extensor tooth subequal to flexor tooth; extensor tooth as wide as flexor at base; notch between extensor and flexor tooth U-shaped. Fourth pereiopod generally similar to third; but ventral margin of carpus without distal spine. Propodus of fifth generally similar to that of fourth and third pereiopod, but with six transversal rows of setae along ventral margin plus one pair of spines near dactylus.

Remarks. This species is very similar to *S. bispinosus* in the combination of characters summarized following: the frontal region of the carapace; the pereiopods; the telson. We agree with the way to distinguish this from *S. bispinosus* as Banner (1975, pp. 343–346), that the posterolateral margin of sixth pleura of *S. bispinosus* each with one acute tooth, while *S. coutierei* without that tooth.

Distribution. South China Sea; From Suez Canal and Persian Gulf south to Mozambique and eastward across the Indo-Pacific.

3.2.8 ***Synalpheus demani*** **Borradaile, 1900** (Figs 14–15)

Synalpheus demani Borradaile, 1900. *Willey's Zool. Res.*, 4: 416; de Man, 1911. *Siboga Exped.*, 39(2): 257, fig. 42; Banner & Banner, 1968. *Microncsica*, 4(2): 274; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 324, fig. 13; Miya, 1972. *Publ. Amakns a Mar. Biol. Lab.*, 3(1): 60, pl. 11.

Alpheus triunguiculatus de Man, 1888. *Archiv. Naturgeseh.*, 53: 504, pl. 22, fig. 1 (nec Paul'son).

Synalpheus spiniger Spence Bate, 1888. *Challenger Repl.*, 24: 560, pl. 100, fig. 3 (nec Stimpson).

Synalpheus broekii Nobili, 1901. *Ann. del Mus. Zool. Napoli*, 1(3): 2.

Material examined. (MBM 157933), 2♂, CL 4.1–5.9 mm, TL 10.1–13.5 mm, Luhuitou, Sanya (16.8°N, 112.3°E), 30 December 1959, Yu-Lin Liao; (MBM 107803), 2♀, 3♂, Yalong Bay, Yezhu Island N-coast, depth 8 m, from *Comanthus* sp., coll. Newmann; (MBM 107800), 1♂, CL 8.2 mm, TL 21.1 mm, Yalong Bay, Yezhu Island, 19 November 1990; (MBM 158952), 5♀, 2♂, CL 6.1–10.1 mm, TL 14.3–26.2 mm, Xincun, 19 April 1958; (MBM 107801), CL 8.1–9.1 mm, TL

20.2–24.5 mm, Yezhu Island, 19 November 1990, coll. Yong-Qiang Wang; (MBM 158952), 1♂, 5 immature specimens, CL 7.2 mm, TL 15.2 mm, Xincun, 19 April 1958.

Description. Carapace smooth, glabrous; rostrum about 3.4 times as long as wide at base, acute tip not reaching end of first segment of antennular peduncle; orbital hoods 2/3 length of rostrum; pterygostomial corner produced into acute angle; cardiac notch well developed.

Telson about 1.3 times as long as wide at base; dorsal surface with two pairs of small spines, inserted approximately at 1/2 and 2/3 length of telson; posterior margin slightly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 2/3 length of mesial, posterolateral margins each produced into acute small tooth, distinctly shorter than lateral spines.

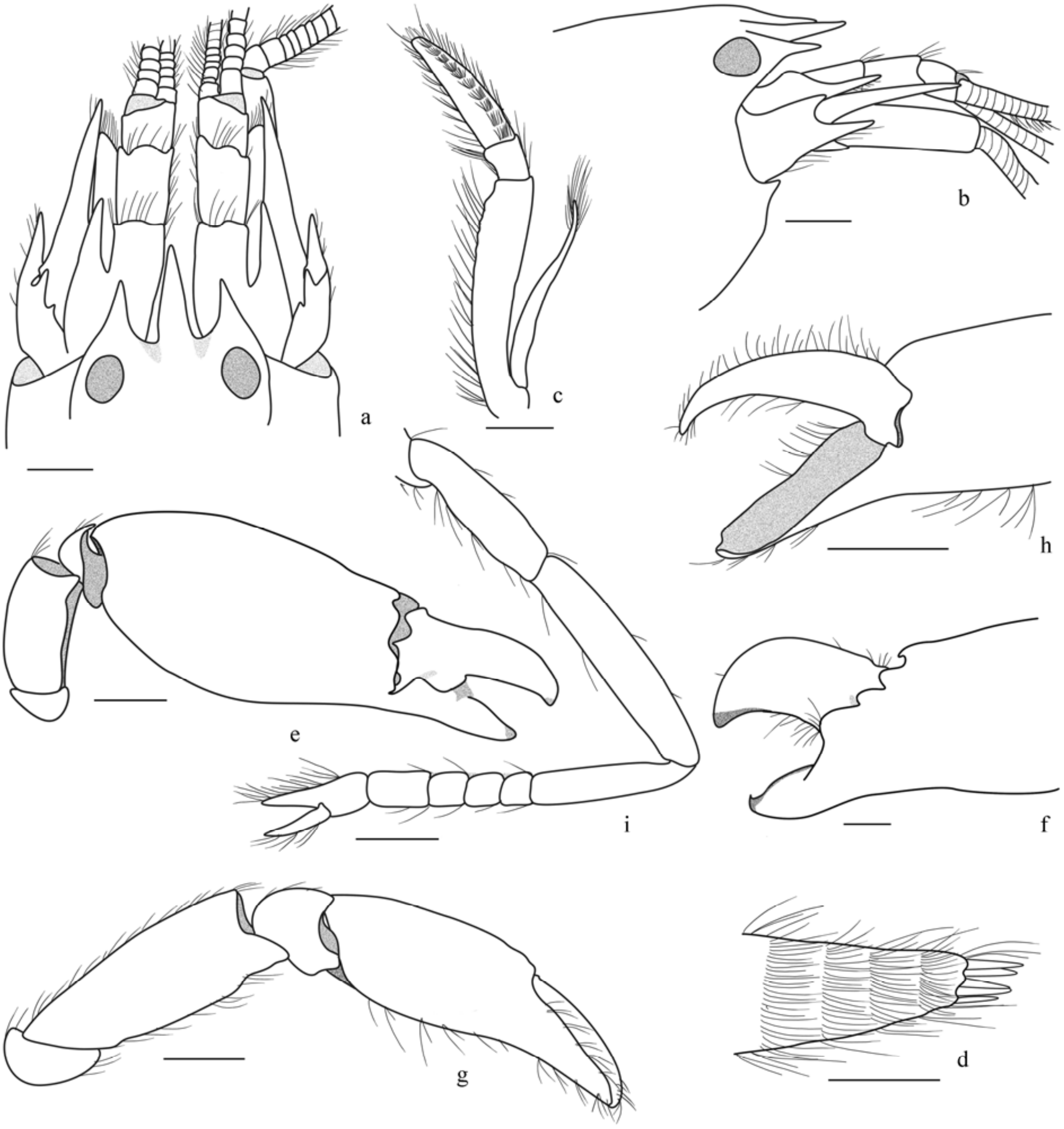

Fig. 14. *Synalpheus demani* Borradaile, 1900, male (cl 4.5 mm) (MBM 107803). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Ventral. d. Tip, ventral. e–f. Major cheliped (right). e. Mesial. f. Chela, lateral. g–h. Minor cheliped (left). g. Lateral. h. Chela, mesial. i. Second pereiopod, lateral. Scale bars: a–c, e–i = 1 mm; d = 0.5 mm.

Eyes concealed in lateral and dorsal view.

Antennular peduncle moderately stout, with distally acute stylocerite, latter reaching about 1/3 length of second segment of antennular peduncle; second segment about 1.5 times as long as wide at base; visible part of first segment longer than second and about twice as long as third. Basicerite with acute distodorsal tooth, distolateral tooth slightly shorter than stylocerite, distolateral margin bearing setae, superior margin of basicerite bearing third short subacute tooth medially; carpocerite slightly overreaching end of third segment of antennular peduncle; scaphocerite blade moderately broad, reaching middle of third segment of antennular peduncle, lateral spine developed, reaching end of antennular peduncle, distinctly shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.5 times as long as wide at base; tip of ultimate segment bearing crown of five spine-like setae, with transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus about 2.7 times as long as wide at base, superodistal margin rounded, without triangular tooth; carpus cup-shaped, with setae distodorsally; palm about 1.8 times as long as dactylus, distodorsal of palm with one subacute projecting, slightly curved to dactylus; dactylus slightly longer than pollex, distally slightly curved.

Minor chela with merus about three times as long as wide at base, superodistal margin rounded, ventral and dorsal margin bearing fine short setae; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.3 times as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 5 : 1 : 1 : 1 : 1.8, with first segment slightly longer than sum of last four segment; dorsal margin of palm convex; fingers about 1.5 times as long as palm. Third pereiopod moderately stout; merus near as long as propodus, about 3.7 times as long as wide at base; carpus about 1/2 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin without distal spine;

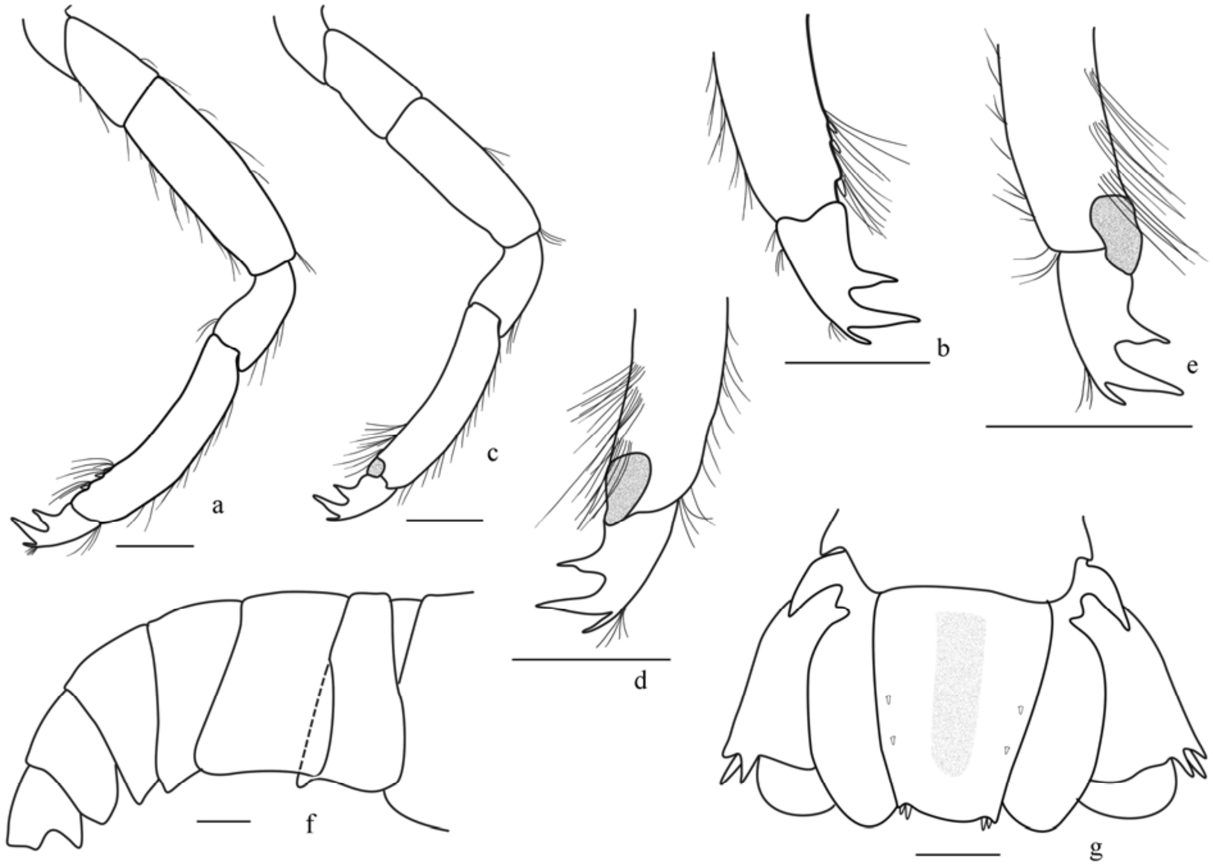

Fig. 15. *Synalpheus demani* Borradaile, 1900. a–b. Third pereiopod. a. Lateral. b. Distal propodus and dactylus, lateral. c–d. Fourth pereiopod. c. Lateral. d. Distal propodus and dactylus, lateral. e. Fifth pereiopod, propodus and dactylus, lateral. f. Abdomen, lateral. g. Telson and uropod, dorsal. Scale bars = 1 mm.

propodus slightly curved, distal with three spines and dense patches of setae; dactylus slightly curved to propodus, triunguiculate, middle tooth about three times as long as extensor tooth, flexor tooth about 1.5 times as long as extensor tooth, notch between extensor and middle tooth V-shaped, middle tooth distinctly much wider than extensor tooth at base, notch between middle tooth and flexor tooth U-shaped, middle tooth slight wider at base than flexor tooth. Fourth pereiopod generally similar to third; merus shorter than propodus, ventral margin of propodus distally bearing patches of setae. Fifth pereiopod similar to third and fourth pereiopod.

Remarks. This species was original described by de Man (1888), under the name *Alpheus triunguiculatus* de Man, 1888. Borradaile (1900) transferred it into the genus *Synalpheus* and given it a new specific name, *S. demani*. This species was original described based on two male specimens collected from Lifu, Loyalty Islands. It was redescribed or illustrated by Miya (1972), Banner & Banner (1975), Chace (1988) and Bruce (1989), which are generally similar to each other.

The present materials are similar from each other and agreed well with the description of Banner & Banner (1975) except the length of the rostrum. It is a pity that the major chela was lost in their description. The major chela in the present specimens is agreed with the description of Miya (1972), in which the second tooth on the superior margin of basicerite was not mentioned. In addition, this species was found only with four segments in the carpus of second pereiopod in Japan Sea, which was not found in our specimens. Furthermore, the length of the rostrum was taken variable in Chace (1988), which reaching to overreaching the end of the first segment of the antennular peduncle. But it is not reaching that end in our specimens.

Distribution. South China Sea; Red Sea, Japan, Philippines, Indonesia, Australia, and Marshall and Loyalty islands.

3.2.9 *Synalpheus fossor* (Paulson, 1875)

Alpheus fossor Paulson, 1875. *Invest. Red Sea Crust.*,: 103, pl. 13. fig. 5.

Synalpheus fossor Coutière, 1905. *Fauna and Geog. Maid and Laccad.*, 2 (4): 872, pl. 70, fig. 6; Tattersall, 1921. *Trans. Linn. Soc. Lond.*, 34(229): 374; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 335, fig. 16.

Synalpheus fossor var. *propinqua* de Man, 1911. *Siboga Exped*, 39(2): 250. fig. 39.

Synalpheus bakeri Coutière, 1908. *Bull. Soc. Philomath. Paris IX*, 11(5): 199 (species described from S. Australia).

Synalpheus bakeri var. *stormi* de Man, 1911. *Siboga Exped.*, 39(2): 253, fig. 40; Banner & Banner, 1966. *Siam Soc. Mono.* 3: 53, fig. 15.

Alpheus sp. *varietas* B de Man, 1897. *Zool. Jb. Syst.*, 9: 741, pl. 35, figs 62c and 62cc (*S. bakeri stormi* acc. de Man, 1911, *loc. cit.*).

Distribution. Hong Kong, South China Sea; Red Sea; Maldive Archipelago; Indonesia; Thailand; Philippines; Australian.

Remarks. This species was reported by Banner & Banner (1978) and Liu (2008) from the South China Sea, but not found in the present specimens.

3.2.10 *Synalpheus gracilirostris* de Man, 1910* (Fig. 16)

Synalpheus gracilirostris de Man, 1910. *Tijdschr. ned. dierk. Vereen*, 11(4): 291; 1911. *Siboga Exped.*, 39(2): 269, fig. 49; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 372, fig. 26.

Material examined. (MBM 107784), 1♂, CL 3.6 mm, Slalao. 4 April 1992. (MBM 159244), 1♂, CL 3.4 mm, Sanya, Dadonghai, South China Sea, 21 November 1997; (MBM 158033), 1 ovigerous ♀, CL 4.2 mm, Nansha Islands, 2 August 1944; 1♂, CL 3.5 mm, (MBM 157909), Nansha Islands, 29 May 1990.

Description. Carapace smooth, glabrous; rostrum about 4.5 times as long as wide at base, 7 times as long as wide at middle, acute tip reaching about 2/3 length of second segment of antennular peduncle; orbital hoods shorter than rostrum, not reaching end of first segment of antennular peduncle; pterygostomial corner produced into acute angle; cardiac notch well developed.

Telson about 1.3 times as long as wide at base; dorsal surface with two pairs of moderately large spines, inserted approximately at 3/7 and 5/7 length of telson; posterior margin strongly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/3 length of mesial, posterolateral margins each produced into small acute tooth, distinctly shorter than contiguous short spines.

Eyes concealed in dorsal and lateral view.

Antennular peduncle moderately slender, with distally acute stylocerite, latter reaching middle of second segment of antennular peduncle; second segment near as long as wide at base; visible part of first segment longer than second and

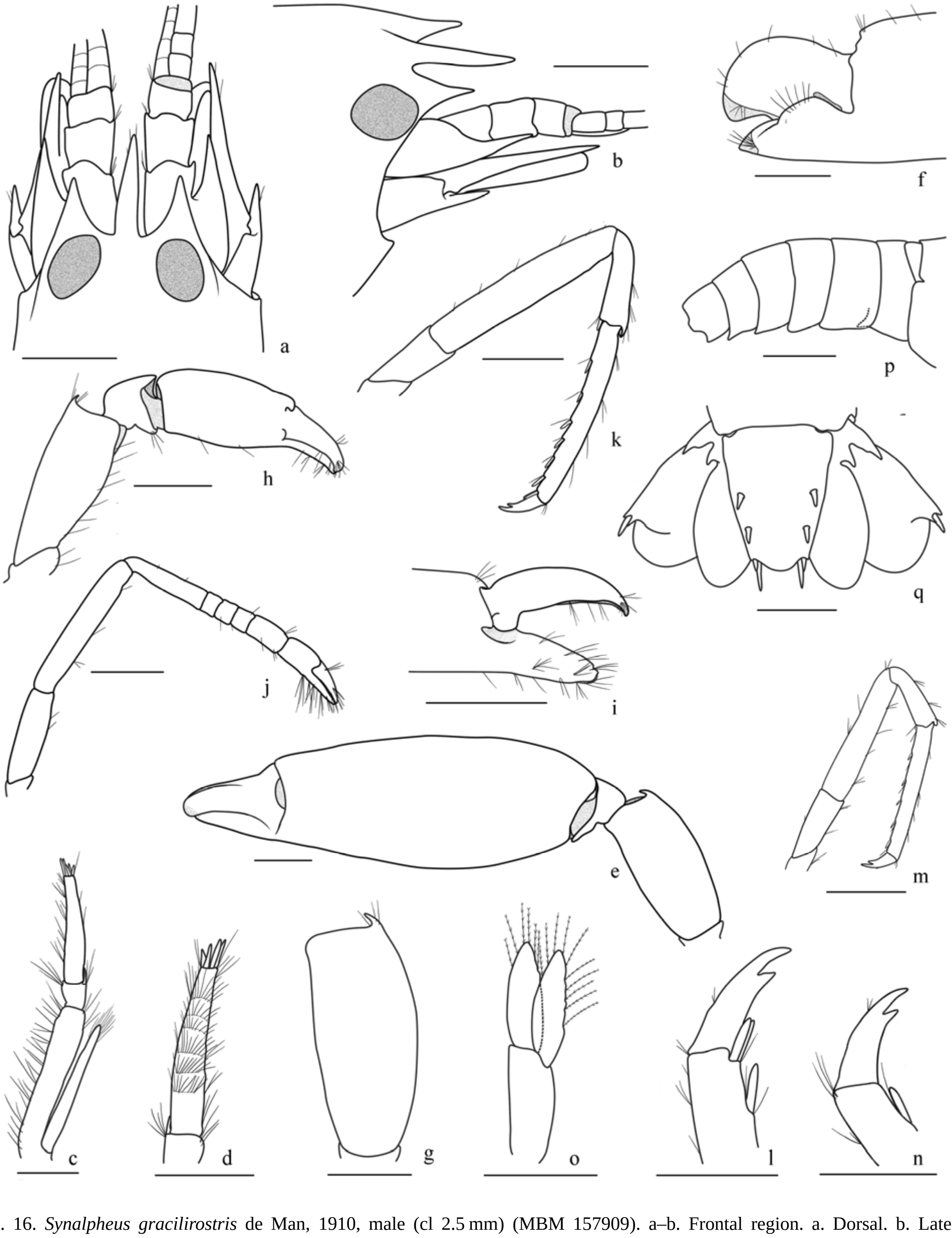

Fig. 16. *Synalpheus gracilirostris* de Man, 1910, male (cl 2.5 mm) (MBM 157909). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Dorsal. d. Tip, ventral. e–g. Major cheliped (left). e. Mesial. f. Chela, lateral. g. Merus, lateral. h–i. Minor cheliped (right). h. Lateral. i. Chela, lateral. j. Second pereiopod, lateral. k–l. Third pereiopod. k. Lateral. l. Distal propodus and dactylus, lateral. m–n. Fourth pereiopod. m. Lateral. n. Distal propodus and dactylus, lateral. o. Second pleopod. p. Abdomen, lateral. q. Telson and uropod, dorsal. Scale bars: a–k, m, o–q = 0.5 mm; l, n = 0.25 mm.

about twice as long as third. Basicerite without distodorsal tooth, distolateral tooth distinctly shorter than stylocerite, not reaching end of first segment of antennular peduncle; carpocerite overreaching end of third segment of antennular peduncle; scaphocerite blade moderately narrow, hardly reaching end of third segment of antennular peduncle, lateral spine developed, overreaching end of antennular peduncle, longer than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.4 times as long as wide at base; tip of ultimate segment bearing crown of five long spine-like setae, with transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus about 3.5 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, with setae distodorsally; palm about 2.8 times as long as dactylus, distodorsal of palm only slightly projecting; dactylus as long as pollex, distally slightly curved.

Minor chela with merus about 3.8 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.9 times as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 5.6 : 1 : 1 : 1 : 2.6, with first segment near as long as sum of last four segments; dorsal margin of palm convex; fingers slightly longer than palm. Third pereiopod moderately slender; merus longer than propodus, about 5.7 times as long as wide at base; carpus less 1/2 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with 6 spines along ventral margin plus one distal pair of spines near dactylus; dactylus about 1/4 length of propodus, slightly curved to propodus, biunguiculate, extensor tooth about twice as long as flexor tooth, notch between extensor and flexor tooth V-shaped, flexor tooth near as wide at base as extensor tooth. Fourth pereiopod generally similar to third; merus near as long as propodus; ventral margin of propodus with 5 spines plus one distal pair of spines.

Remarks. De Man (1910) originally described this species. The present specimens generally agree with that description. Banner & Banner (1975) redescribed this species based on Australian specimens. The redescription differs from the original decription in the following characters: basicerite with distolateral tooth subequal to stylocerite; basicerite present the distodorsal tooth; the distal superior margin of the palm in major chela bearing one acute projecting; posterolateral margins of the telson each produced in one acute tooth. Banner & Banner (1975) ever considered to give a new specific name to those varieties. But they took it as intraspecific variation at last because of the few specimens. Then, they (1985) recorded five specimens, three of which are agreed with Banner & Banner (1975), another two are agreed with the original description. All of our collection is generally agreed with the original description. The variety of Banner & Banner (1975) is not found here.

Distribution. South China Sea; Timor in Indonesia; southern Philippines; Red Sea; eastern Africa; Réunion; Mauritius; Australia.

3.2.11 *Synalpheus hastilicrassus* Coutière, 1905 (Fig. 17)

Synalpheus hastilicrassus Coutière, 1905a. *Fauna and Geog. Maid, and Laccad.*, 2(4): 875, pl. 72, fig. 12; de Man. 1911. *Siboga Exped.*, 39(2): 263, fig. 45 (*parlim*); Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 353, fig. 21.

Synalpheus hastilicrassus Coutière var. ? de Man, 1911. *Siboga Exped.*, 39(2): 264, fig. 45 (*parlim*).

Synalpheus hastilicrassus acanthitelsoniformis de Man, 1920. *Zool. Meded., Leiden*, 5(3): 108; 1922. *Siboga Exped.*, 39(5): 29, fig. 14.

Synalpheus acanthitelsonis Coutière, 1905. *Loc. Cit.*, 2(4): 875, fig. 13; de Man. 1911. *Loc. Cit.*: 256, fig. 46; Gravely, 1930. *Bull. Madras Govt Mus. New Ser. (Nat. Hist.)*, 1(2): 77, pl. I, fig.1; Banner & Banner, 1966. *Siam Soc. Mono.*, 3: 58, fig. 18.

Material examined. CL 3.2–6.1 mm, TL 6.8–12.1 mm. (MBM 270350), 1 ovigerous ♀, Tonkin Gulf (Beibu Gulf), Sta. 6167, depth 57 m, 8 October 1960, coll. Bao-Lin Zhang; (MBM 270351), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6167, depth 57 m, 8 October 1960, coll. Bao-Lin Zhang; (MBM 270076), 1 ovigerous ♀, Jinqing Island, Xisha Islands, 23 May 1974; (MBM 270709), 1 ovigerous ♀, 1♂, Linchang, 3 December 1990; (MBM 270599), 1 ovigerous ♀, 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7502, depth 32 m, 15 April 1962; (MBM 270608), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 7305, depth 64 m, 18 October 1965; 2 ovigerous ♀, 2♂, depth 9 m, 25 March 1992, coll. Li-Ren Cheng; (MBM 107764), 2 ovigerous ♀, 3♂, Yalong Bay, Yezhu Island, depth 6–11 m, 20 November 1990; (MBM 107766), 1♂, Yalong Bay, Yezhu Island, 17 November 1990, coll. Newmann; (MBM 159244), 1 ovigerous ♀, 1♂, Sanya, dadonghai, depth 7–10 m, 21 November 1997, coll. Xin-Zheng Li; (MBM 107785), 1♂, Shalao, 4 April 1992; (MBM 158489), 1 ovigerous ♀; (MBM 158728), 1♂, Jinqing Island, Xisha Islands, 25 April 1958, coll. Zhen-Gang Fan, Jie-Shan Xu; (MBM 159299), 3 ovigerous ♀, 4♂; (MBM 159278), (MBM 270600), 2♂, 1 ovigerous ♀, Tonkin Gulf (Beibu Gulf), Sta. 7403, depth 38 m, 21 August 1962, coll. Fu-Zeng Sun; (MBM 159310), 3 ovigerous ♀, 2♂, 1 immature specimens, Nanhai, Xincun, depth 1–3 m, 26 March 1992; (MBM 159279), 4 ovigerous ♀, Yezhu Island, 27 March 1992; (MBM 158223), 2♂, 26 December 1954, coll. Rui-Yu Liu; (MBM 159206), 1 ovigerous ♀, Sanya, Dadonghai, depth 5–9 m, 3 December 1997, coll. Xin-Zheng Li;

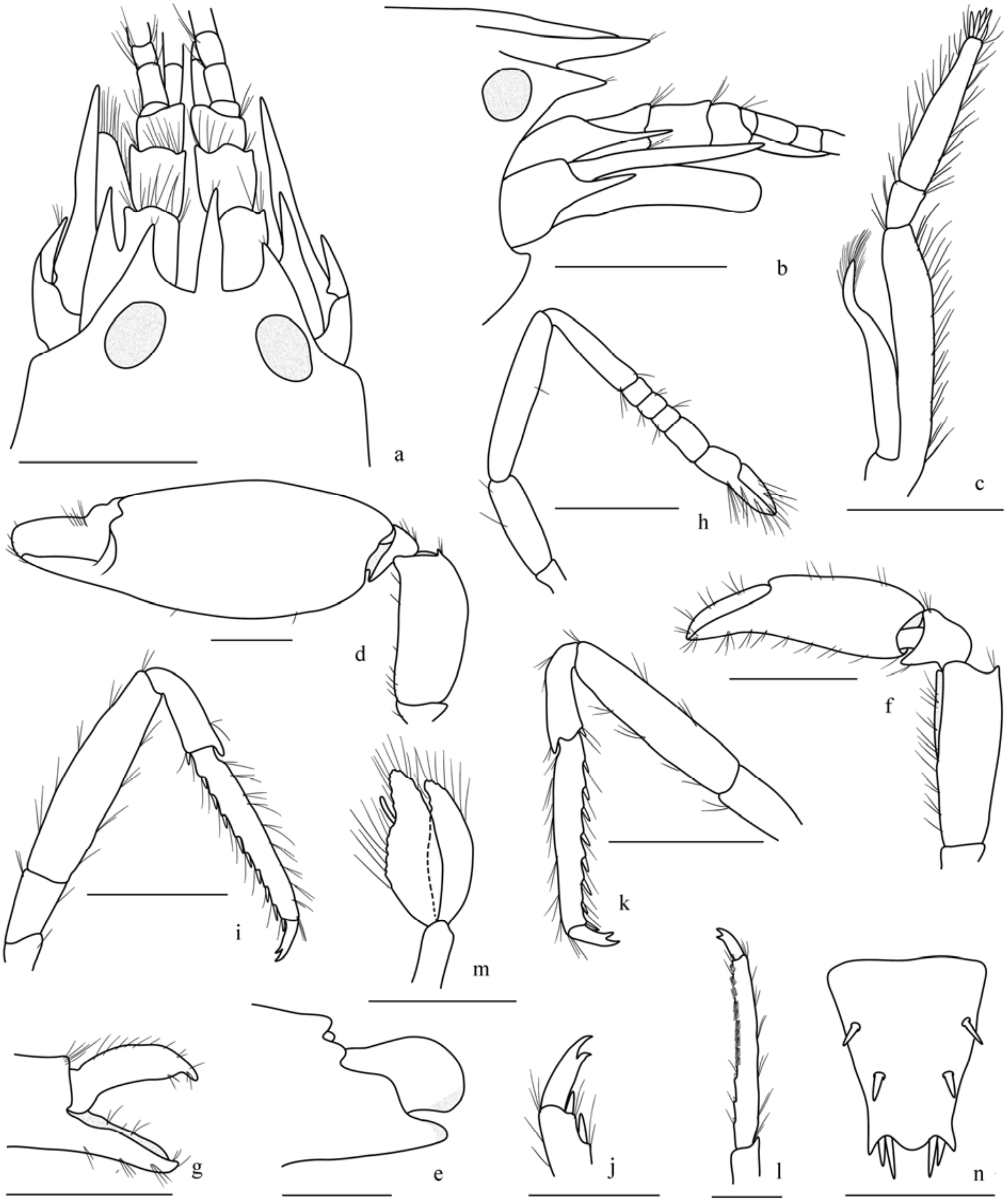

Fig. 17. *Synalpheus hastilicrassus* Coutière, 1905, female (cl 4.1 mm) (MBM 159279). a–b. Frontal region. a. Dorsal. b. Lateral. c. Third maxilliped, dorsal. d–e. Major cheliped. d. Mesial. e. Chela, lateral. f–g. Minor cheliped. f. Lateral. g. Chela, lateral. h. Second pereiopod, lateral. i–j. Third pereiopod. i. Lateral. j. Distal propodus and dactylus, lateral. k. Fourth pereiopod, lateral. l. Fifth pereiopod, propodus and dactylus, lateral. m. Second pleopod. n. Telson, dorsal. Scale bars: a–i, k–n = 1 mm; j = 0.5 mm.

(MBM 158541), 2 ovigerous ♀, Yalong Bay, Yezhu Island, 19 March 1992, coll. Xin-Zheng Li; (MBM 158499) , 1 ovigerous ♀; (MBM 158543), 1♂.

Description. Carapace smooth, glabrous; rostrum about 3.2 times as long as wide at base, acute tip overreaching end of first segment of antennular peduncle; orbital hoods shorter than rostrum, longer than wider at base; pterygostomial corner produced into acute angle; cardiac notch well developed.

Telson about 1.2 times as long as wide at base; dorsal surface with two pairs of spines, inserted approximately at 1/3 and 2/3 length of telson; posterior margin strongly produced, fringed with long setae, posterolateral angle each with two pairs of large spines, lateral slightly shorter than mesial, posterolateral margins each produced into large acute tooth, slightly shorter than or subequal to contiguous spines.

Eyes concealed in dorsal and lateral view.

Antennular peduncle moderately slender, with distally acute stylocerite, latter hardly reaching middle of second segment of antennular peduncle; second segment about 1.5 times as long as wide at base; visible part of first segment longer than second and less twice as long as third. Basicerite with or without distodorsal tooth, distolateral tooth variously from distinctly shorter than to subequal to stylocerite; carpocerite far overreaching end of third segment of antennular peduncle; scaphocerite blade moderately narrow, reaching middle of third segment of antennular peduncle, lateral spine developed, overreaching end of antennular peduncle, much shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.5 times as long as wide at base; tip of ultimate segment bearing crown of five long spine-like setae, with transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus about 3 times as long as wide at base, superodistal margin with acute triangular tooth; carpus cup-shaped, with setae distodorsally; palm about 2.3 times as long as dactylus, distodorsal of palm with at most an obtuse projecting; dactylus as long as pollex, distally slightly curved.

Minor chela with merus about 4 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.4 times as long as fingers; dactylus and pollex tapering, superior surface of dactylus bearing row of moderately short setae, extending almost full length of dactylus distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 5 : 1 : 1 : 1 : 1.6, with first segment slightly longer than sum of last four segments; dorsal margin of palm convex; fingers about 1.5 times as long as palm. Third pereiopod moderately slender; merus slightly longer than propodus, about 5.3 times as long as wide at base; carpus about 1/3 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with 8–9 spines along ventral margin plus one distal pair of spines near dactylus; dactylus about 1/4 length of propodus, slightly curved to propodus, biunguiculate, extensor tooth slightly longer and slightly wider at base than flexor tooth. Fourth pereiopod generally similar to third; ventral margin of propodus with 7 spines plus one distal pair of spines. Fifth pereiopod similar to third and fourth pereiopods, ventral margin of carpus without distal one spine; ventral margin of propodus with 9 transversal rows of spine-like setae and 3 spines.

Remarks. This species is rather complex (Banner & Banner, 1975). It is readily recognized by the posterior lateral margins of the telson produced into large tooth, slightly shorter than the contiguous spines. The present specimens are generally agreed with the redescriptions (Banner & Banner, 1975; Chace, 1988), but the distodorsal tooth of the basiceritehas marked variety. This variation lies within that recorded by Banner & Banner.

Distribution. South China Sea; Maldive Archipelago; Gulf of Manaar; Indonesia; Philippiines, Caroline and Marshall Islands; Fiji; Australia.

3.2.12 ***Synalpheus iocasta* de Man, 1909** (Figs 18–19)

Synalpheus iocasta de Man, 1909. *Tijdschr. ned. dierk. Verecn.*, 11(2): 119; 1911, *Siboga Exped.* 39(2): 235, fig. 33; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 368, fig. 24i–n.

Material examined. (MBM 270422), 1♂, CL 4.1 mm, Tonkin Gulf (Beibu Gulf), Sta. 7802, depth 67 m, 10 April 1962, coll. Fu-Zeng Sun; (MBM 270587), 1♂, CL 4.2 mm, Tonkin Gulf (Beibu Gulf), Sta. 6266, depth 50.5 m, 13 July 1960, coll. Shou-Peng Shen; (MBM 270423), 1♂, CL 4.1 mm, TL 11.1 mm, Tonkin Gulf (Beibu Gulf), Sta. 7303, depth 34 m, 20 April 1960.

Description. Carapace smooth, glabrous; rostrum about 2.8 times as long as wide at base, acute tip not reaching end of first segment of antennular peduncle; orbital hoods slightly shorter than rostrum; pterygostomial corner produced into

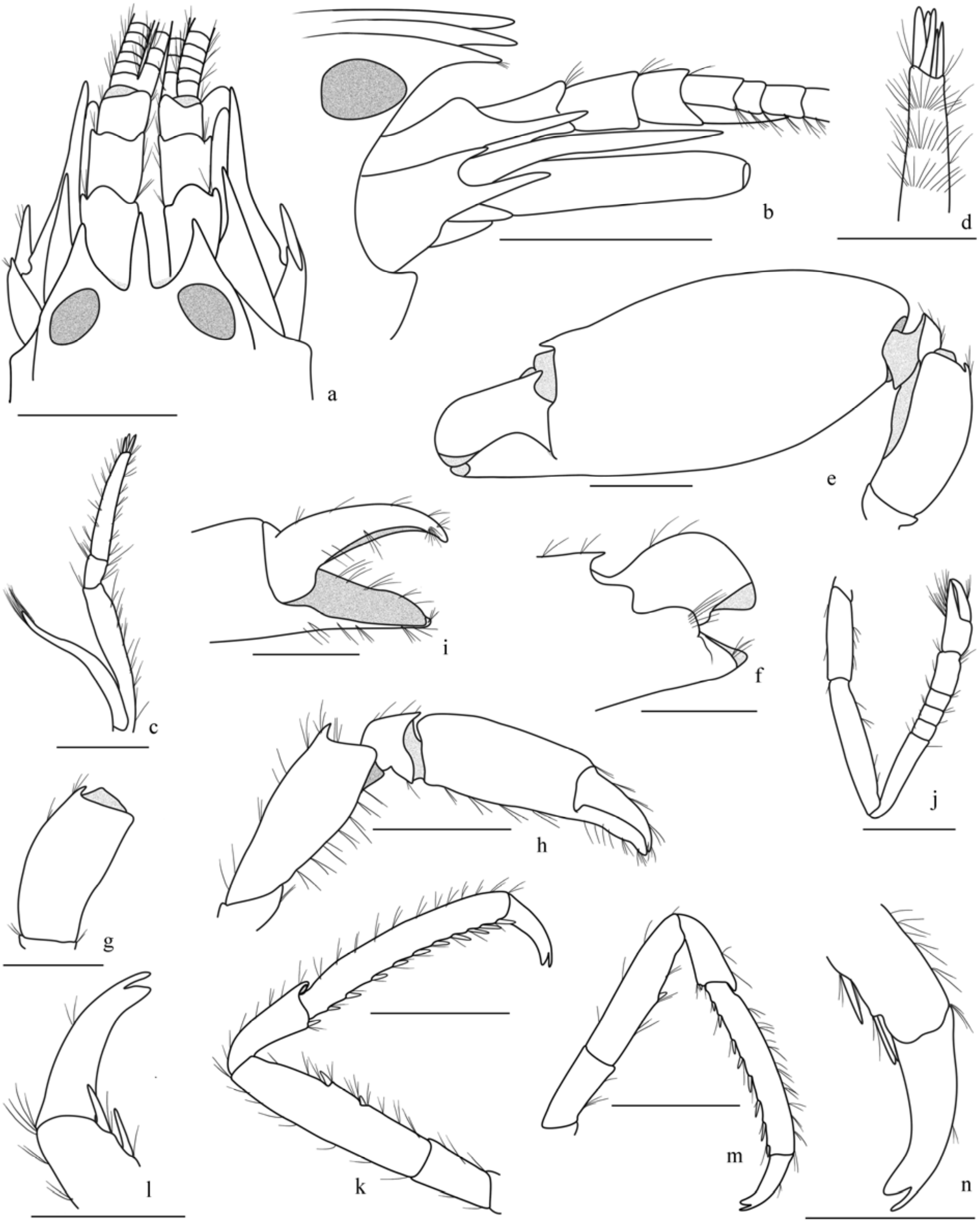

Fig. 18. *Synalpheus iocasta* de Man, 1909, female (cl 4.1 mm) (MBM 270587). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Dorsal. d. Tip, ventral. e–g. Major cheliped (left). e. Mesial. f. Chela, lateral. g. Merus, lateral. h–i. Minor cheliped (right). h. Lateral. i. Chela, mesial. j. Second pereiopod, lateral. k–l. Third pereiopod. k. Lateral. l. Distal propodus and dactylus, lateral. m–n. Fourth pereiopod. m. Lateral. n. Distal propodus and dactylus, lateral. Scale bars: a–c, e–k, m = 1 mm; d, l, n = 0.5 mm.

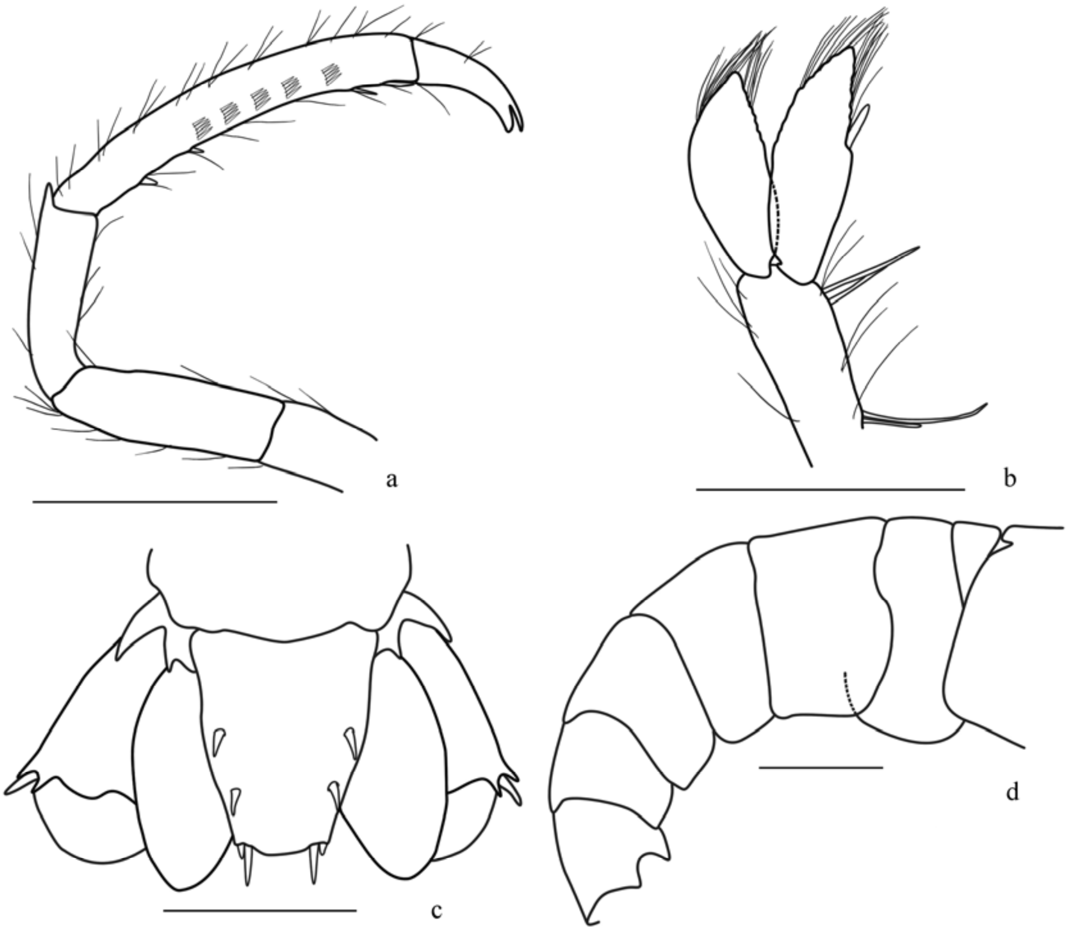

Fig. 19. *Synalpheus iocasta* de Man, 1909, female (cl 4.1 mm) (MBM 270587). a. Fifth pereiopod, propodus and dactylus, lateral. b. Second pleopod. c. Telson and uropod, dorsal. d. Abdomen, lateral. Scale bars = 1 mm.

acute angle; cardiac notch well developed.

Telson about 1.2 times as long as wide at base; dorsal surface with two pairs of moderately large spines, inserted approximately at 1/2 and 5/7 length of telson; posterior margin slightly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/4 length of mesial, posterolateral margins not produced into acute tooth.

Eyes concealed in lateral and dorsal view.

Antennular peduncle moderately slender, with distally acute stylocerite, latter hardly reaching middle of second segment of antennular peduncle; second segment about 1.25 times as long as wide at base; visible part of first segment longer than second and about twice as long as third. Basicerite with acute distodorsal tooth, about 1/3 length of distolateral tooth, distolateral tooth distinctly shorter than stylocerite, hardly reaching end of first segment of antennular peduncle; carpocerite far overreaching end of third segment of antennular peduncle; scaphocerite blade moderately narrow, reaching 3/4 length of third segment of antennular peduncle, lateral spine developed, overreaching end of antennular peduncle, much shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.3 times as long as wide at base; tip of ultimate segment bearing crown of five long spine-like setae, with transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus about 2.5 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, with setae distodorsally; palm about 2.5 times as long as dactylus, distodorsal of palm with one acute projecting, straightly, not curved to dactylus; dactylus near as long as pollex, distally slightly curved.

Minor chela with merus about 3.6 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.7 times as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 6 : 1 : 1 : 1 : 2.5, with first segment longer than sum of last four segment; dorsal margin of palm convex; fingers about 1.5 times as long as palm. Third pereiopod moderately slender; merus shorter than propodus, about 5 times as long as wide at base, ventral margin with 2 spines; carpus less 1/2 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with nine spines along ventral margin plus one distal pair of spines near dactylus; dactylus about 2/7 length of propodus, slightly curved to propodus, biunguiculate, extensor tooth near as long as flexor tooth, notch between extensor and flexor tooth V-shaped, flexor tooth much wider at base than extensor tooth. Fourth pereiopod generally similar to third; merus shorter than propodus, ventral margin with one moderately large spine; ventral margin of propodus with seven spines plus one distal pair of spines. Fifth pereiopod similar to third and fourth pereiopods, ventral margin of carpus without distal one spine; ventral margin of propodus with five transversal rows of spine-like setae and four spines.

Remarks. This species is generally similar to *Synalpheus pococki* Coutière, 1898. The only valid difference between them is the number of spines on propodus of the third pereiopods (de Man, 1911; Banner & Banner, 1975).

De Man (1909) originally described this species. The present specimens are generally agreed with the original description, except the following characters: the posterolateral margins of the telson were not produced into acute teeth rather than “the outer angles of the posterior margin are spiniform, half as long as the contiguous short spinules”; the posterior margin of the telson only slightly produced rather than “the posterior margin rather prominent in the middle, almost semicircular”. Because these characters are variable in *Synalpheus*, it is not wise to take our specimens as a new species.

Distribution. South China Sea; Indonesia; Australia; Philippines.

3.2.13 *Synalpheus iphinoe* de Man, 1909* (Figs 20–22)

Synalpheus iphinoë de Man, 1909. *Tijdschr. ned. dierk. Verecn.*, 11(2): 116.
Synalpheus jedanensis de Man, 1909. *Tijdschr. ned. dierk. Verecn.*, 11(2): 117.

Material examined. CL 3.1–5.9 mm, TL 6.7–11.9 mm. (MBM 270449), 52 ovigerous ♀, 10 immature specimens, Tonkin Gulf (Beibu Gulf), Sta. 6277, depth 35 m, 19 October 1960, coll. Shou-Peng Shen; (MBM 270447), 30 ovigerous ♀, 17♂, Tonkin Gulf (Beibu Gulf), Sta. 6277, depth 13.5 m, 9 July 1960, coll. Zhen-Gang Fan; (MBM 270595), 3 ovigerous ♀, 6♂, 14 immature specimens, Tonkin Gulf (Beibu Gulf), Sta. 6277, depth 31.3 m, 11 May 1960, coll. Zhen-Gang Fan; (MBM 270584), 3♂, Tonkin Gulf (Beibu Gulf), Sta. 6283, depth 25 m, 11 February 1960, coll. Zhen-Gang Fan, Ruan; (MBM 270199), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6282, depth 28 m, 11 February 1960, coll. Zhen-Gang Fan; (MBM 270598), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6276, depth 30 m, 5 December 1959, coll. Zhen-Gang Fan; (MBM 270239), 1 ovigerous ♀, 3♂, Tonkin Gulf (Beibu Gulf), Sta. 6284, depth 18.5 m, 18 May 1960, coll. Zhen-Gang Fan; (MBM 270581), 3 ovigerous ♀, 4♂, Tonkin Gulf (Beibu Gulf), Sta. 6237, depth 50.5 m, 14 April 1960, coll. Xiu-Bin Fang; (MBM 270194), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7502, depth 32 m, 15 January 1962, coll. Fu-Zeng Sun; (MBM 270585), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6267, depth 32 m, 5 November 1960, coll. Bao-Lin Zhang; (MBM 270439), 4 ovigerous ♀, 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6280, depth 27 m, 5 December 1959, coll. Xiu-Tong Ma; (MBM 270451), 1 ovigerous ♀, 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6261, depth 42 m, 4 December 1959, coll. Zhen-Gang Fan; (MBM 270527), 17 specimens, Tonkin Gulf (Beibu Gulf), Sta. 7603, depth 44 m, 18 August 1962, coll. Fu-Zeng Sun; (MBM 270539), 3♀ (two ovigerous), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 7602, depth 26 m, 18 August 1962; (MBM 270583), 1 ovigerous ♀, 3♂, Tonkin Gulf (Beibu Gulf), Sta. 6269, depth 30 m, 6 November 1960, coll. Bao-Lin Zhang; (MBM 270597), 2 ovigerous ♀, 7♂, Tonkin Gulf (Beibu Gulf), Sta. 6282, depth 28 m, 9 July 1960, coll. Zhen-Gang Fan, Ruan; (MBM 270583), 4♀ (three ovigerous), 27♂, Tonkin Gulf (Beibu Gulf), Sta. 6277, depth 35 m, 11 February 1960, coll. Zhen-Gang Fan; (MBM 270579), 11♀ (ten ovigerous), 9♂, Tonkin Gulf (Beibu Gulf), Sta. 6276, depth 29 m, 6 November 1960; (MBM 270126), 49♂, Tonkin Gulf (Beibu Gulf), Sta. 6277, depth 35 m, 9 March 1960, coll. Zhen-Gang Fan, Feng-Shan Xu; (MBM 158690),1 ovigerous ♀, 2♂, Nansha Islands, Sta. 55, depth 46 m, 8 June 1960; (MBM 158364), 1♂, Nansha Islands, Sta. 64, depth 44 m, 9 June 1960; (MBM 270445), 23 ovigerous ♀, 27♂, Tonkin Gulf (Beibu Gulf), Sta. 6277, depth 35 m, 19 October 1960, coll. Shou-Peng Shen; (MBM 270582), 2 ovigerous ♀, 4♂, Tonkin Gulf (Beibu Gulf), Sta. 6249, depth 31 m, 7 November 1960, coll. Bao-Lin Zhang; (MBM 158846), 1♂, Nansha

Islands, Sta. Z 13, depth 50 m, 28 April 1986; (MBM 270440),1♂, Tonkin Gulf (Beibu Gulf), Sta. 7604, depth 58 m, 12 January 1962, coll. Fu-Zeng Sun; (MBM 270377), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6265, depth 66.3 m, 14 July 1960, coll. Zhen-Gang Fan.

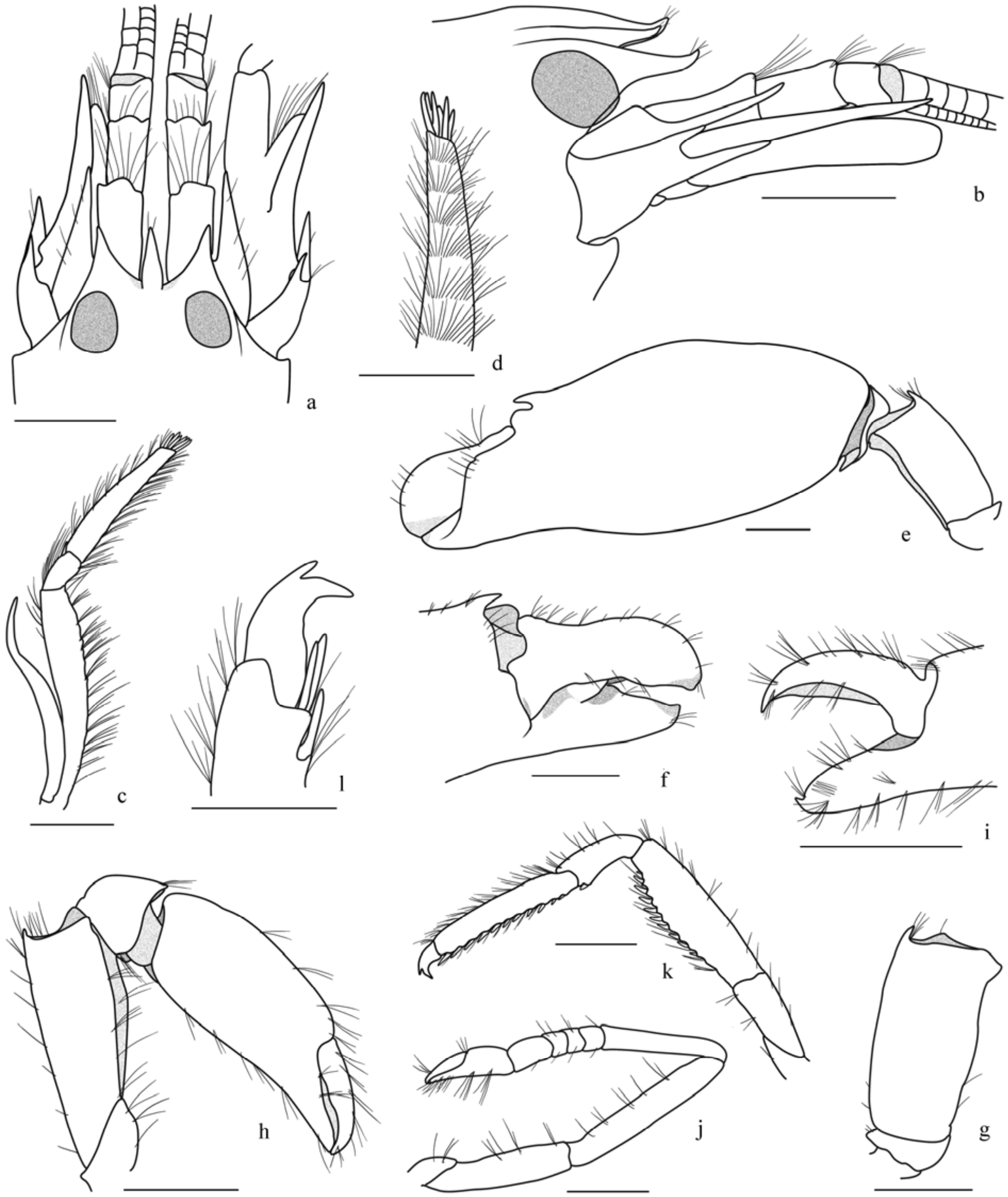

Fig. 20. *Synalpheus iphinoe* de Man, 1909, female (cl 5.7 mm) (MBM 158695). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Dorsal. d. Tip, ventral. e–g. Major cheliped (right). e. Mesial. f. Chela, lateral. g. Merus, lateral. h–i. Minor cheliped (left). h. Lateral. i. Chela, lateral. j. Second pereiopod, lateral. k–l. Third pereiopod. k. Lateral. l. Distal propodus and dactylus, lateral. Scale bars: a–c, e–k = 1 mm; d, l = 0.5 mm.

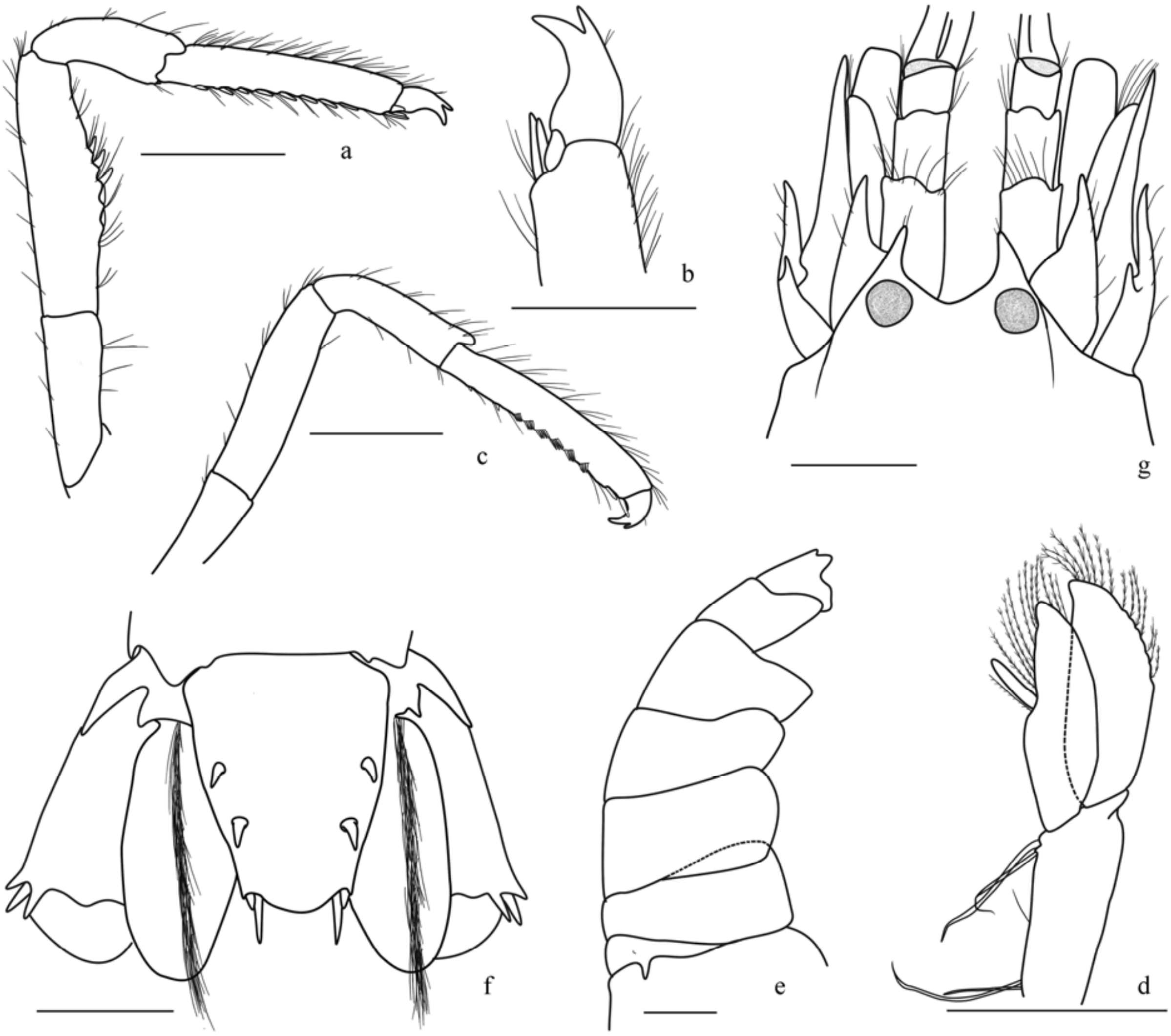

Fig. 21. *Synalpheus iphinoe* de Man, 1909, female (cl 5.7 mm) (MBM 158695). a–b. Fourth pereiopod. a. Lateral. b. Distal propodus and dactylus, lateral. c. Fifth pereiopod. d. Second pleopod. e. Abdomen, lateral. f. Telson and uropod, dorsal. g. Female (cl 5.9 mm) (MBM 270539) frontal region, dorsal. Scale bars: b = 0.5 mm; a, c–g = 1 mm.

Description. Carapace smooth, glabrous; conical rostrum about 3 times as long as wide at base, acute tip overreaching middle of first segment of antennular peduncle; orbital hoods slightly longer than rostrum, diverge slightly outward, both rostrum and orbital hoods distinctly curved upturned at tips; pterygostomial corner produced into acute angle; cardiac notch well developed.

Telson about 1.3 times as long as wide at base; dorsal surface with two pairs of spines, inserted approximately at 2/5 and 3/5 length of telson; posterior margin strongly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/3 length of mesial, posterolateral margins each produced into acute small tooth, but distinctly shorter than lateral spines. Media-dorsal of endopod bearing dense setae, coves all length of it.

Eyes concealed in dorsal view, slightly exposed in lateral view.

Antennular peduncle slender, with distally acute stylocerite, latter reaching about 1/4 length of second segment of antennular peduncle; second segment about 1.7 times as long as wide at base; visible part of first segment longer than second and more than twice as long as third. Basicerite with acute distodorsal tooth, less 1/2 length of distolateral tooth, latter distinctly shorter than stylocerite, not reaching end of first segment of antennular peduncle; carpocerite overreaching end of third segment of antennular peduncle; scaphocerite blade moderately narrow, reaching about 1/2 length of third segment of antennular peduncle, lateral spine developed, overreaching end of antennular peduncle, hardly shorter than

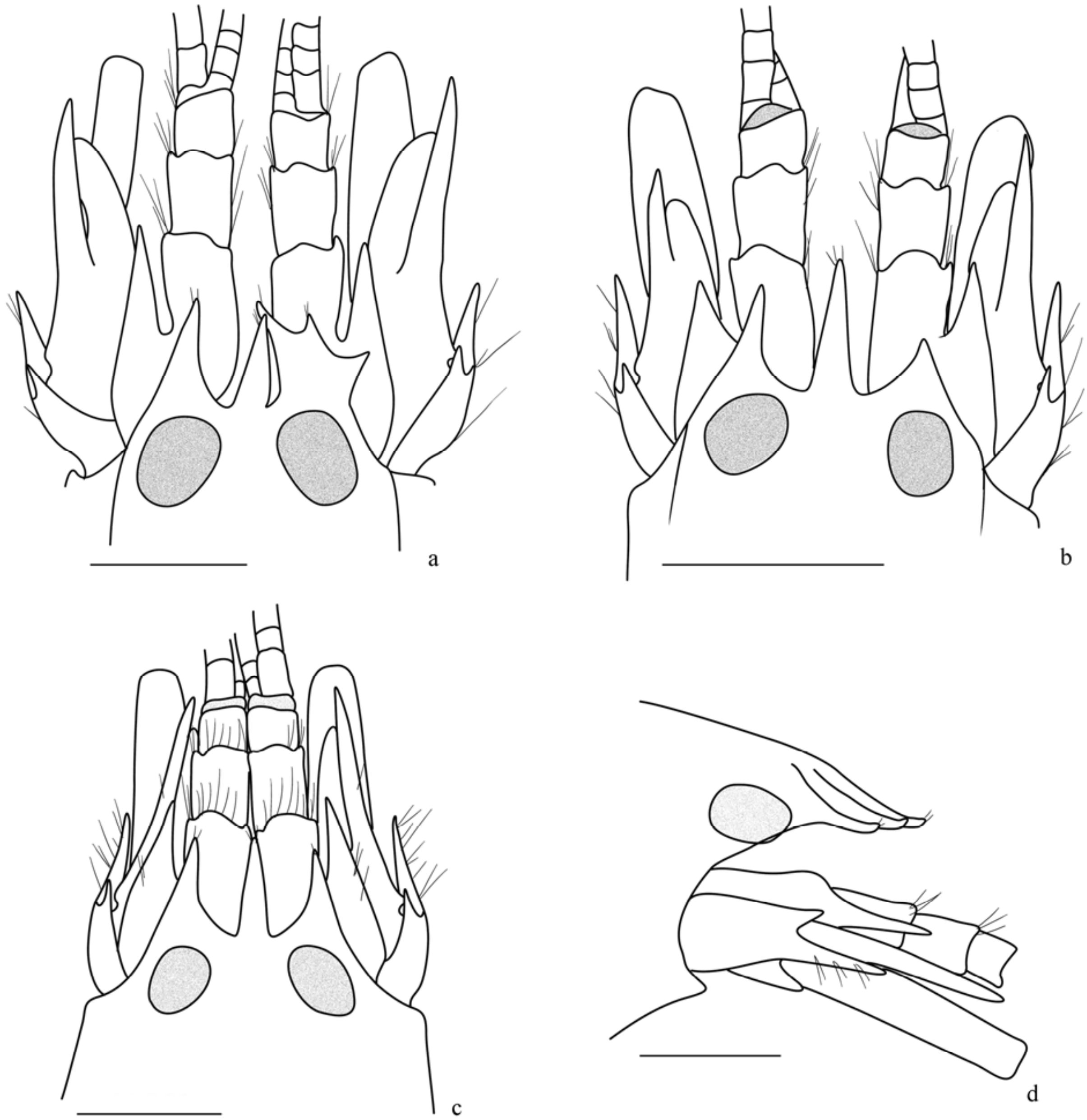

Fig. 22. *Synalpheus iphinoe* de Man, 1909, male (cl 4.9 mm) (MBM 158690). a. Frontal region, dorsal. b–d. Frontal region, male. b. Dorsal (cl 4.5 mm) (MBM 270126). c. Dorsal (cl 5.1 mm) (MBM 270126). d. Lateral (cl 5.1 mm) (MBM 270126). Scale bars = 1 mm.

carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.7 times as long as wide at base; tip of ultimate segment bearing crown of moderately long six spine-like setae, with transverse rows of long setae along ventral margin.

Major cheliped with short, stout ischium; merus about 2.6 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, with setae distodorsally; palm about 2.3 times as long as dactylus, distodorsal of palm with one strong acute projecting, slightly upturned at base and curved to dactylus at tip; dactylus slightly longer than pollex.

Minor chela with merus about 3 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, proportionally longer that of major cheliped; palm about twice as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 7 : 1 : 1 : 1 : 2.7, with first segment distinctly longer than sum of last four segment; dorsal margin of palm convex; fingers about 1.3 times as long as palm. Third pereiopod moderately slender; merus longer than propodus, about 4 times as long as wide at base, ventral margin with 10 moderately large spines; carpus less 1/2 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with 11 spines along ventral margin plus one distal pair of spines near dactylus; dactylus about 1/5 length of propodus, slightly curved to propodus, biunguiculate, extensor tooth about 1/3 length of flexor tooth, notch between extensor and flexor tooth V-shaped, flexor tooth much wider at base than extensor tooth. Fourth pereiopod generally similar to third; merus slightly longer than propodus, ventral margin with five moderately large spines; ventral margin of propodus with 8 spines plus distal one pair spines. Fifth pereiopod similar to third and fourth pereiopods, but ventral margin of carpus without one distal spine; merus slightly shorter than propodus, ventral margin without spines; ventral margin of propodus with 6 transversal rows of spine-like setae and three spines.

Remarks. *Synalpheus iphinoe* and *S. jedanensis* were originally described by de Man (1909) based on 7 and 6 specimens, respectively. They are morphologically very similar to *S. neomeris*, and can be separated from each other by the minor chela. The morphological characters used by de Man to separate the three species are: setae on the frontal teeth; the proportions of three segments of the antennular peduncle; the proportions of the small chela; the number of spines on the merus of the third pereiopods; the posterolateral margins each produced to spines or not. However, some of these characters were variable in alpheids, so Banner & Banner (1985) put *S. iphinoe* and *S. jedanensis* under the name *S. iphinoe* on the basis of page priority. De Grave & Fransen (2011) listed *S. jedanensis* as a valid species, we think it is unwise.

Banner & Banner (1985) presented "*S. iphinoe* be separated from *S. neomeris* on basis of small size, the probable heavier small chela, and the upturned tips to the frontal teeth". The present materials (over 200 specimens) have following differences from *S. neomeris*: the total length of the specimens varied from 6.5 mm to 13.2 mm, contrasted to the longest specimen of *S. neomeris* (about 30 mm); the fingers of the minor chela in *S. neomeris* subequal to or slightly shorter than palm, in *S. iphinoe* the ratio of fingers / palm length of minor chela about 0.5; the frontal teeth of part of our specimens were upturned at tips. The present specimens are slightly variable in the shape of the rostrum (Figs 22c–d), but this variation is not enough to separate them into two species. Additionally, three of our specimens are aberrant at the frontal teeth: lost the rostrum (Fig. 21g), or the right orbital hood bearing three teeth at tip (Fig. 22a), or the right orbital hoods of the other specimen reduced (Fig. 22b). Those differences might cause by effects of the environment.

Distribution. Tonkin Gulf (Beibu Gulf), South China Sea; Sapeh-Strait; Southern Molo-Strait; Banda-anchorage; Roma Island; East cost of Aru Islands.

3.2.14 ***Synalpheus jinqingensis* sp. nov.** (Figs 23–25)

Material examined. Holotype (MBM 283385), ♀, CL 4.6 mm, TL 12.5 mm, Jinqing Island, Xisha Islands (16°27′57″N, 111°44′17″E), 25 April 1958, coll. Zhen-Gang Fan, Jie-Shan Xu. Paratypes: (MBM 283385), 1♂, CL 4.5 mm, TL 10.5 mm, Jinqing Island, Xisha Islands (16°27′57″N, 111°44′17″E), 25 April 1958, coll. Zhen-Gang Fan, Jie-Shan Xu; (MBM 283386), 1♀, CL 4.1 mm, TL 10.5 mm, Jinqing Island, Xisha Islands (16°27′57″N, 111°44′17″E), 25 April 1958, coll. Zhen-Gang Fan, Jie-Shan Xu.

Description. Carapace smooth, glabrous; rostrum 1.7 as long as wide at base, with lateral margins slightly convex, rounded tip bearing two short setae, reaching about 2/3 length of visible part of first segment of antennular peduncle; orbital hoods about 1.5 times as wide at base as rostrum, distinctly shorter than rostrum, with rounded tip bearing two short setae; notches between orbital hoods moderately deep, V-shaped; pterygostomial corner produced into blunt acute angle.

Abdominal somites smooth, glabrous. Telson about 1.1 times as long as wide at base; lateral margin slightly concave posteriorly; dorsal surface with median groove, with two pairs of large spines, inserted approximately at 1/4 and 1/2 length of telson; posterior margin strongly convex, fringed with long setae, posterolateral angle each with two pairs of spines, lateral 1/2 length of mesial, posterolateral margins each produced into acute tooth, but distinctly shorter than lateral spine.

Eyes concealed in lateral and dorsal view.

Antennular peduncle slender, with distally acute stylocerite, latter overreaching middle of second segment of antennular peduncle, about 1/6–1/5 length of second; second segment 1.3 times as long as wide; visible part of first segment slightly longer than second, latter subequal to third. Antenna with basicerite with acute distodorsal tooth, 1/7 length of distolateral tooth, latter hardly overreaching middle of third segment, distinctly longer than stylocerite;

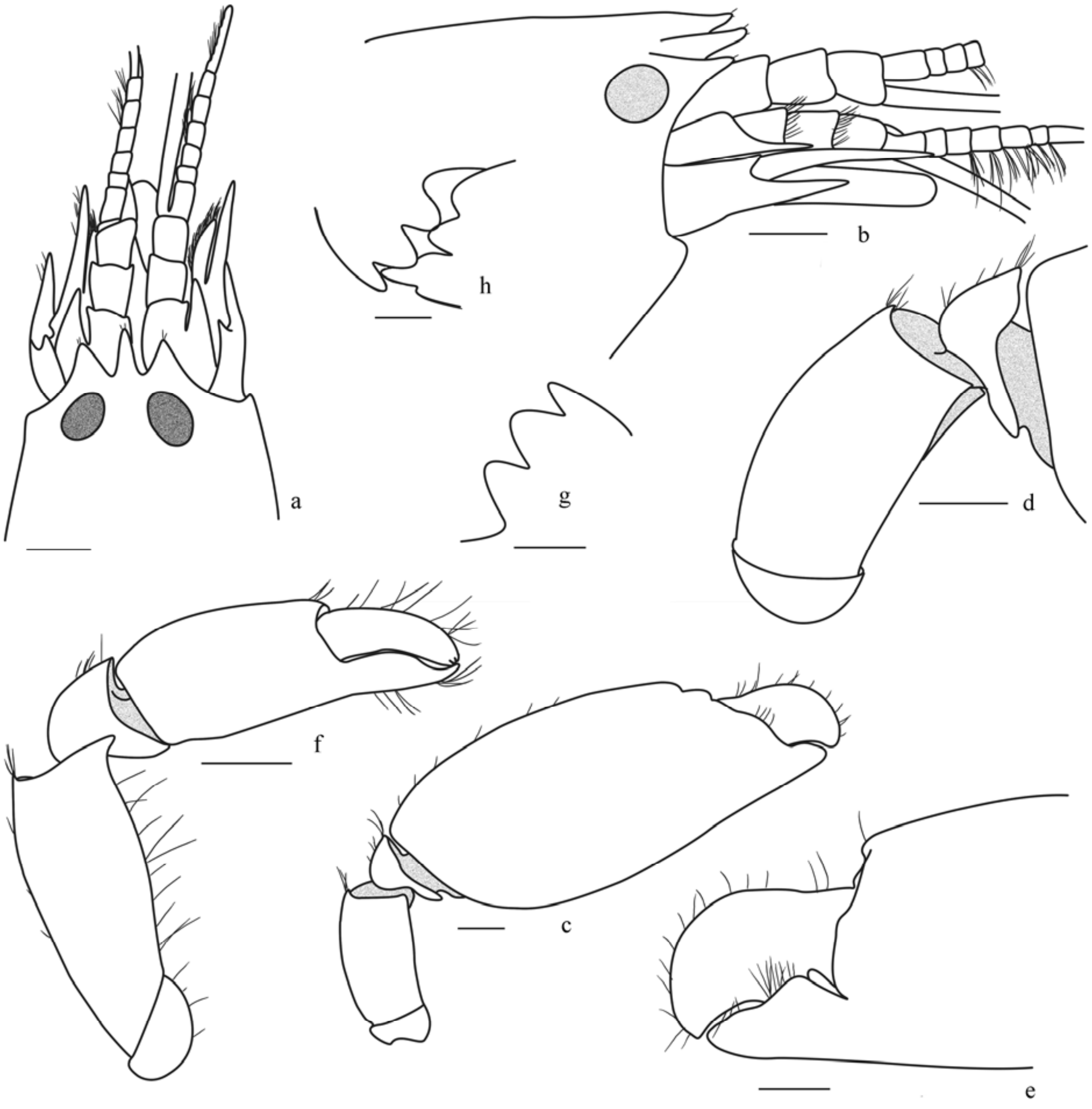

Fig. 23. *Synalpheus jinqingensis* **sp. nov.**, female (cl 4.6 mm) (MBM 283385). a–b. Frontal region. a. Dorsal. b. Lateral. c–e. Major cheliped. c. Mesial. d. Merus, lateral. e. Chela, lateral. f–h. Minor cheliped (right). f. Lateral. g. Tip of dactylus, mesial. h. Tip of dactylus and pollex. Scale bars: a–f, i–j = 0.5 mm; g–h = 0.1 mm.

carpocerite beyond end of antennular peduncle by 1/3 length of third segment; scaphocerite blade narrow, slightly longer than antennular peduncle, lateral spine with lateral margin slightly concave posteriorly, slightly shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest, about 4.6 times as long as wide; penultimate segment about 1.3 times as long as wide at base; tip of ultimate segment bearing crown of five spine-like long setae, with several brush consisting of 6–8 transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus 2.2 times as long as wide at base, superodistal margin ending in acute tooth; carpus cup-shaped, with long setae distodorsally; chela cylindrical, not a bit compressed or twisted, with palm about 3.2 times as long as dactylus, superodistal margin of palm almost without projecting; dactylus longer than pollex.

Minor chela with merus about 3.2 times as long as wide, longer than that of major cheliped, superodistal margin ending in acute tooth, ventral margin bearing short setae; carpus cup-shaped proportionally longer that of major cheliped; palm about 1.6 times as long as fingers; dactylus spatulate, with flexor margin slightly convex, distal three similarly teeth; pollex spatulate, with flexor surface obliquely convex, distal four teeth, with one longest, two middle and one shortest.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 4 : 1 : 1 : 1 : 2, with first segment shorter than sum of last four segment, segments 2–4 wider than long; dorsal margin of palm convex; fingers slightly shorter than palm. Third pereiopod stout; merus longer than propodus, about four times as long as wide at base, without spines on ventral margin; carpus about 1/3 merus length, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with usual eight spines along ventral margin plus one distal pair of spines near dactylus; dactylus around 1/6 propodus length, biunguiculate, moderately slender, extensor tooth slightly longer than

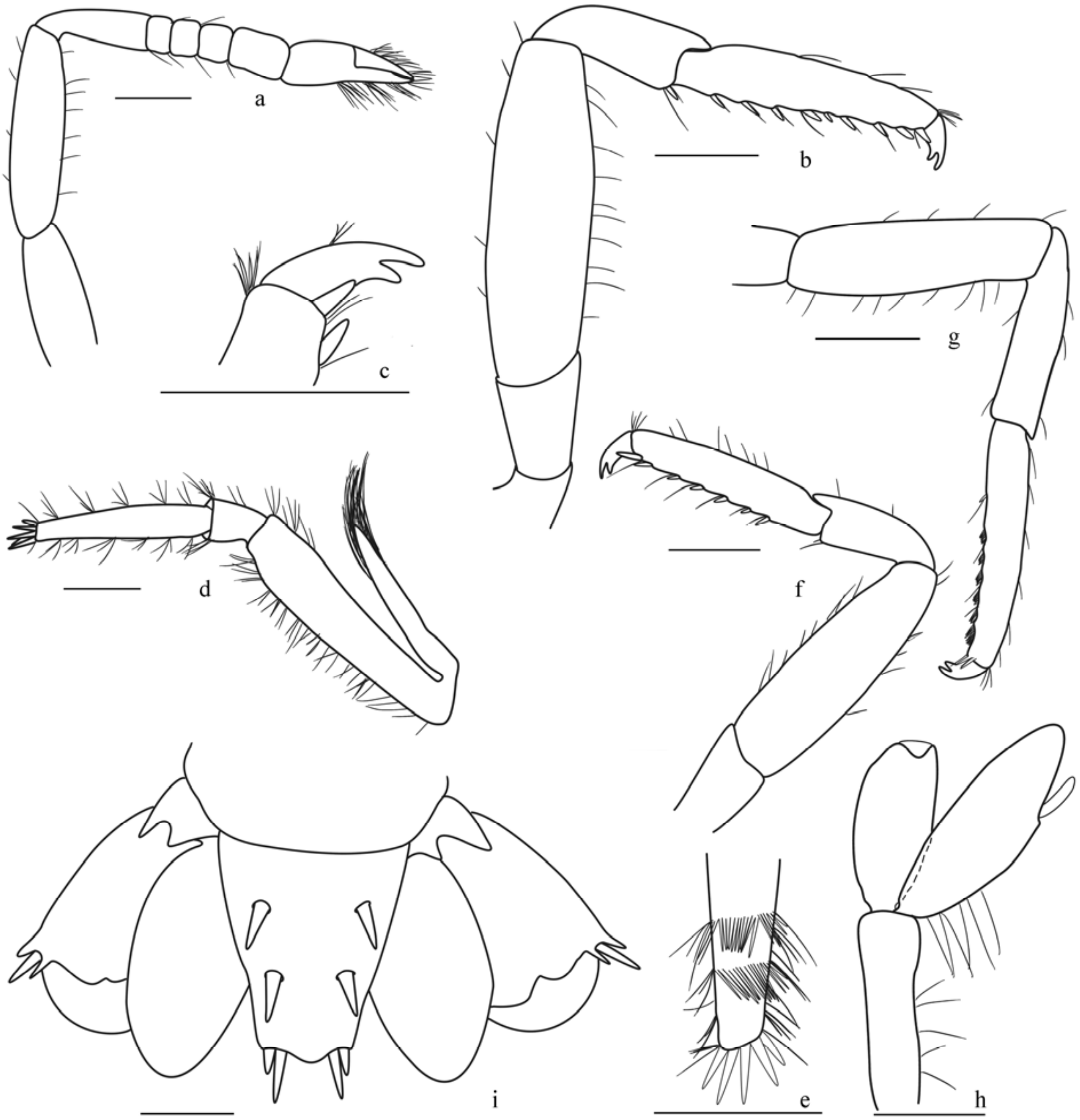

Fig. 24. *Synalpheus jinqingensis* **sp. nov.**, female (cl 4.6 mm) (MBM 283385). a. Second pereiopod, lateral. b–c. Third pereiopod. b. Lateral. c. Distal propodus and dactylus, lateral. d–e. Third maxilliped. d. Dorsal. e. Tip, dorsal. f. Fourth pereiopod, lateral. g. Fifth pereiopod, lateral. h. Second pleopod. i. Telson and uropod, dorsal. Scale bars = 0.5 mm.

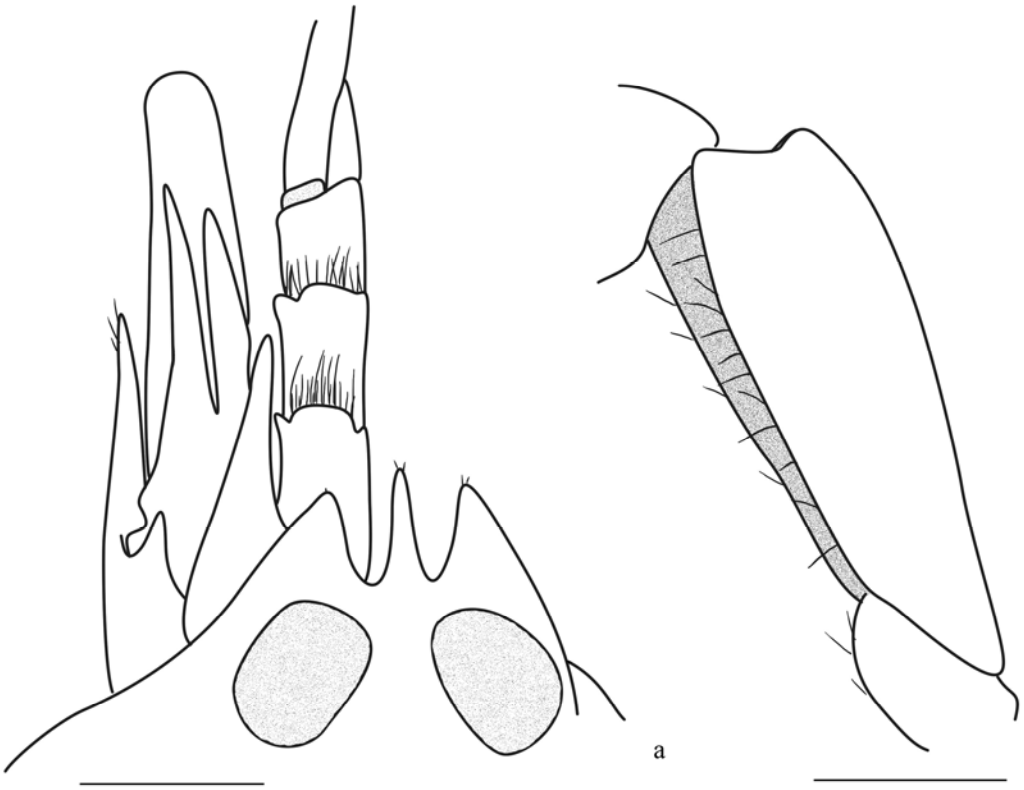

Fig. 25. *Synalpheus jinqingensis* **sp. nov.**, female (cl 4.5 mm) (MBM 283385). a. Frontal region, dorsal. b. Minor cheliped, merus, lateral. Scale bars = 0.5 mm.

flexor tooth, subwide flexor tooth at base; notch between extensor and flexor tooth V-shaped. Fourth pereiopod generally similar to third; but ventral margin of carpus without distal spine. Fifth pereiopod with merus about 3.5 times as long as wide; carpus about 5/7 merus length, ventral margin without distal spine; propodus slightly shorter than merus, with one moveable spine and seven transversal rows of setae along ventral margin plus one pair of spines near dactylus.

Etymology. "jinqing" meaning the Jinqing Islalnd, the type locality of this new species.

Type locality. Jinqing Island, Xisha Islands, South China Sea.

Distribution. Xisha Islands, presently known only from the type locality in South China Sea.

Table 2. Comparision of *Synalpheus jinqingensis* sp. nov. and its similar species.

Species characters	*S. sciro*	*S. pescadorensis*	*S. antenor*	*S. liui* **sp. nov.**	*S. jinqingensis* **sp. nov.**
Istodorsal tooth of basicerite	Acute	Acute	Without	Acute	Acute
Distodorsal margin tooth of merus, major cheliped	Acute, triangular tooth	Rounded, without any projecting	Acute, triangular tooth	Acute, triangular tooth	Acute, triangular tooth
Superodistal margin tooth of palm, major cheliped	Blunt tubercle armed with distal acute tooth	Swollen tubercle armed with distal acute tooth	Acute in male, blunt tubercle in female	Blunt tubercle armed with subacute tooth	At most small blunt produced
Posterior margin of telson	Narrow, not produced	Narrow, not produced	Slightly convex	Narrow, not produced	Strongly produced

Remarks. *Synalpheus jinqingensis* **sp. nov.** can be distinctly distinguished from other species by distal of spatulate dactylus and pollex of minor chela with three and four teeth, respectively. In the Indo-Pacific waters, the distal of fingers of minor chela spinform are only found in four species: *S. sciro*, *S. pescadorensis*, *S. antenor*, *S. liui* **sp. nov.** This new species can distinguished from above four species by the characters summarized in Table 2.

One specimen has slightly differences from others in following two ways: the stylocerite varying from the middle of the second segment to the end of that segment, the distolateral of the basicerite varying from the end of second segment to the middle of the third segment, but the stylocerite always distinctly shorter than the distolateral of the basicerite (Fig. 25a); the superodistal margin of the merus of minor chela (one paratype) rounded, without any projecting (Fig. 25b).

3.2.15 *Synalpheus liui* sp. nov. (Figs 26–28)

Material examined. Holotype. (MBM 283382), non-ovigerous individual, CL 3.2 mm, TL 8.1 mm, Zhubi Jiao, Nansha Islands, Sta. 9 (10°54.997′N, 114°05.813′E), depth 3 m, 5 May 2004, coll. Yong-Liang Wang from coral reef. Paratype (MBM 283382), non-ovigerous individual, CL 4.3 mm, TL 9.6 mm, same data as holotype.

Description. Carapace smooth, glabrous; rostrum with lateral margins slightly convex, rounded tip reaching 1/2 length of visible part of first segment of antennular peduncle, bearing two short setae, slightly upturned; orbital hoods about 1.5 as wide at base as rostrum, length almost equal to rostrum, rounded tip bearing two short setae, slightly upturned; pterygostomial corner produced into blunt acute angle.

Abdominal somites smooth, glabrous, posterolateral margin of sixth pleura each with one blunt tooth, posterior corner of first pleura bluntly produced ventrally; second-fifth with lower margin produced into acute angle. Telson about 1.1 as long as wide at base; lateral margins slightly concave posteriorly; dorsal surface slightly convex, with median groove, with two pairs of large spines, inserted approximately at 2/5 and 1/2 length of telson; posterior margin not produced, slightly concave, fringed with long setae, posterolateral angle each with two pairs of spines, lateral 1/2 length of mesial,

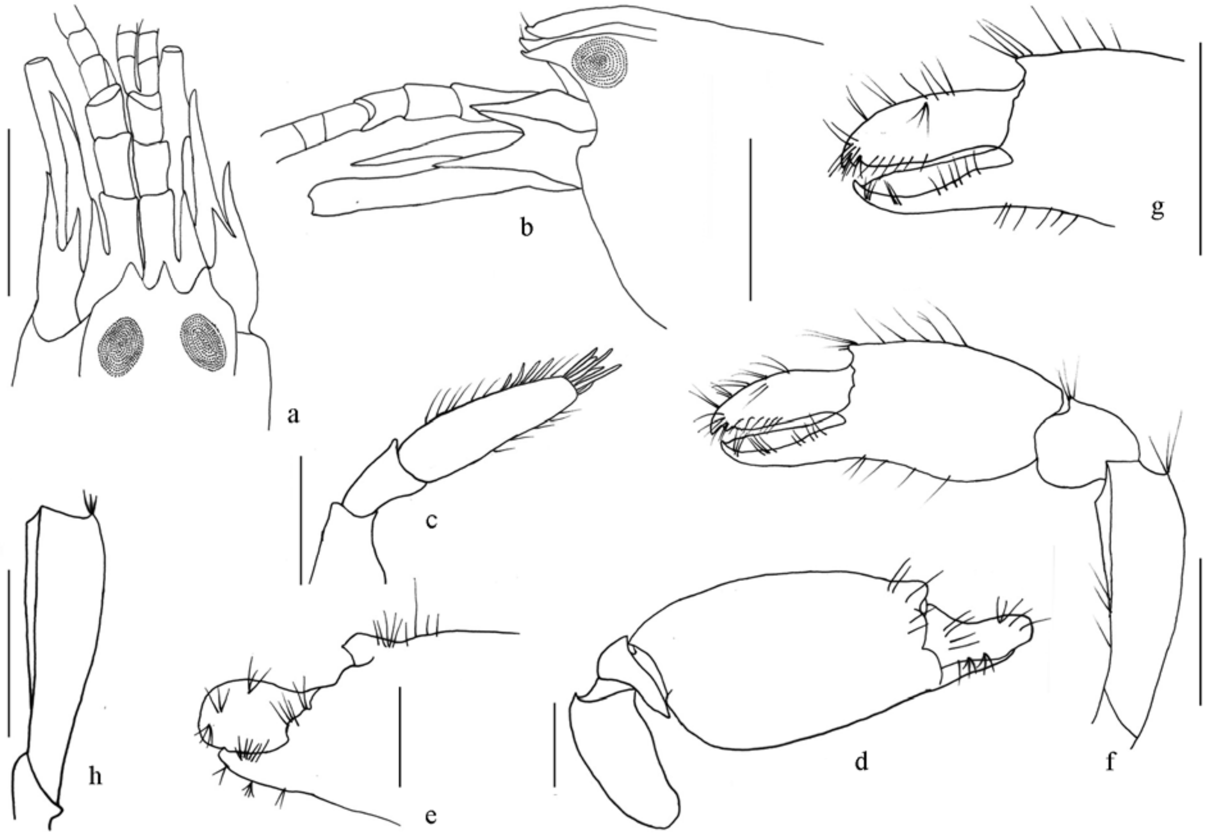

Fig. 26. *Synalpheus liui* **sp. nov.,** male (cl 3.2 mm) (MBM 283382). a–b. Frontal region. a. Dorsal view. b. Lateral view. c. Left third maxilliped, lateral view. d–e. Large chela. d. Dorsal view. e. Lateral view. f–g. Small chela, lateral view. f. Total. g. Fingers. h. Merus. Scale bars: a, b, d–h = 1 mm; c = 0.5 mm.

posterolateral margins forming right angles. Eyes concealed in lateral and dorsal view.

Antennular peduncle with distally acute stylocerite, latter hardly reaching distal margin of first segment of antennular peduncle; second segment distinctly longer than wide; visible part of first segment longer than second and about twice as long as third segment. Antenna with basicerite with acute distodorsal tooth, 1/2 length of distolateral tooth, subequal to stylocerite, distolateral tooth distinctly longer than stylocerite, overreaching middle of second antennular segment; carpocerite beyond end of antennular peduncle by the length of third segment; scaphocerite blade narrow, reaching end of second segment of antennular peduncle, lateral spine robust, with lateral margin slightly concave posteriorly, overreaching antennular peduncle, shorter than carpocerite.

Mouthparts not dissected. Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest, about five times as long as wide; penultimate segment about 2.5 times as long as wide at base; tip of ultimate segment bearing crown of 5–6 spine-like long setae, with several brush consisting of 6–8 transverse rows of setae along ventral margin. Origin of marginal setae on pleopod two exopod close to base.

Major cheliped with merus 3.8 times as long as wide at base, superodistal margin with acute triangular tooth, inferointernal margin with acute tooth; carpus cup-shaped, with setae distodorsally; chela cylindrical, not a bit compressed or twisted, with palm about 2.6 times as long as dactylus, superodistal margin produced into prominent tubercle with little subacute ventrally directed tooth; dactylus distinctly longer than pollex.

Minor chela with merus about 4.4 times as long as wide, longer than that of major cheliped, superodistal margin with acute triangular tooth; carpus cup-shaped, proportionally longer than that of major cheliped; palm 1.5 times as long as

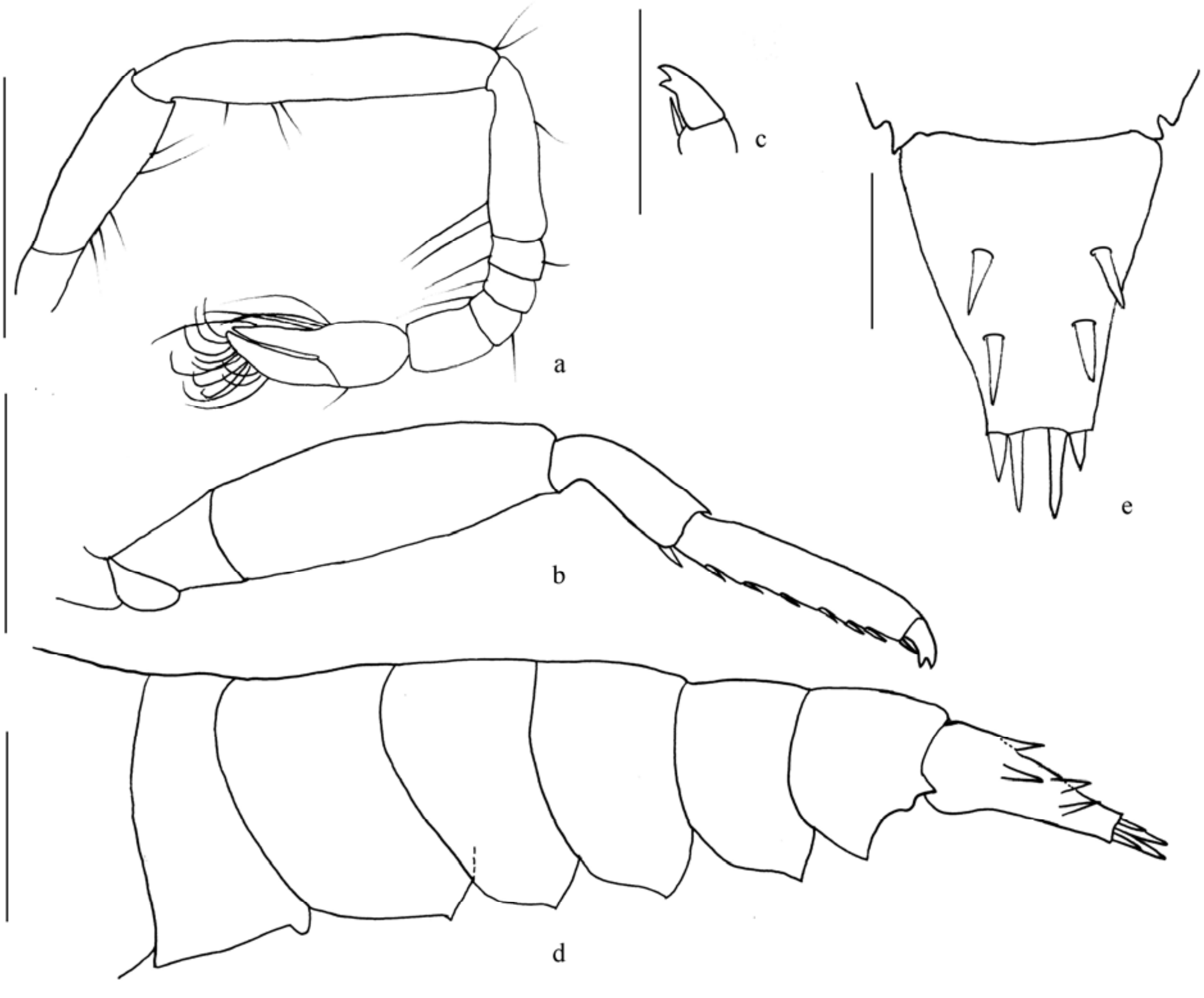

Fig. 27. *Synalpheus liui* **sp. nov**. male (cl 3.2 mm) (MBM 283382). a. Left second pereiopod, lateral view. b. Left third pereiopod, lateral view. c. Dactylus of third pereiopod, lateral view. d. Abdomen and telson, later view. e. Telson, dorsal view. Scale bars: a–b, d = 1 mm; c, e = 0.5 mm.

fingers; dactylus excavate and denticulate, with flexor margin slightly convex, distal with one large tooth medially, smaller tooth adjacently, lateral margin bearing row of long setae; pollex tapering distally, with flexor surface obliquely convex, distal single tooth, lateral margin bearing row of long setae.

Second pereiopod with ischium distinctly shorter than merus; carpus five-segmented, segment ratio subequal to 4.7 : 1 : 1 : 1 : 2.1, with first segment little shorter than sum of last four segments; fingers 1.2 times as long as palm. Third pereiopod stout; merus longer than propodus, about three times as long as wide, without spines on ventral margin; carpus about 1/2 merus length, with dorsal margin extended into an obtuse tooth, ventral margin with one long distal spine; propodus with usual seven spines along ventral margin plus one distal pair of spines near dactylus; dactylus around 1/6 propodus length, biunguiculate, moderately slender, extensor tooth 1.5 times length of flexor tooth, thicker at base than flexor tooth, notch between extensor tooth and flexor tooth V-shaped. Fourth pereiopod generally similar to third; but ventral margin of carpus without distal spine. Fifth pereiopod stout, with merus about three times as long as wide, without spines on ventral margin; carpus about 7/9 merus length, ventral margin without distal spine; propodus slightly longer than merus, with one moveable spine and 7–9 transverse rows of short setae along on ventral margin plus one distal pair of spines near dactylus, dactylus similar that of three and four pereiopod.

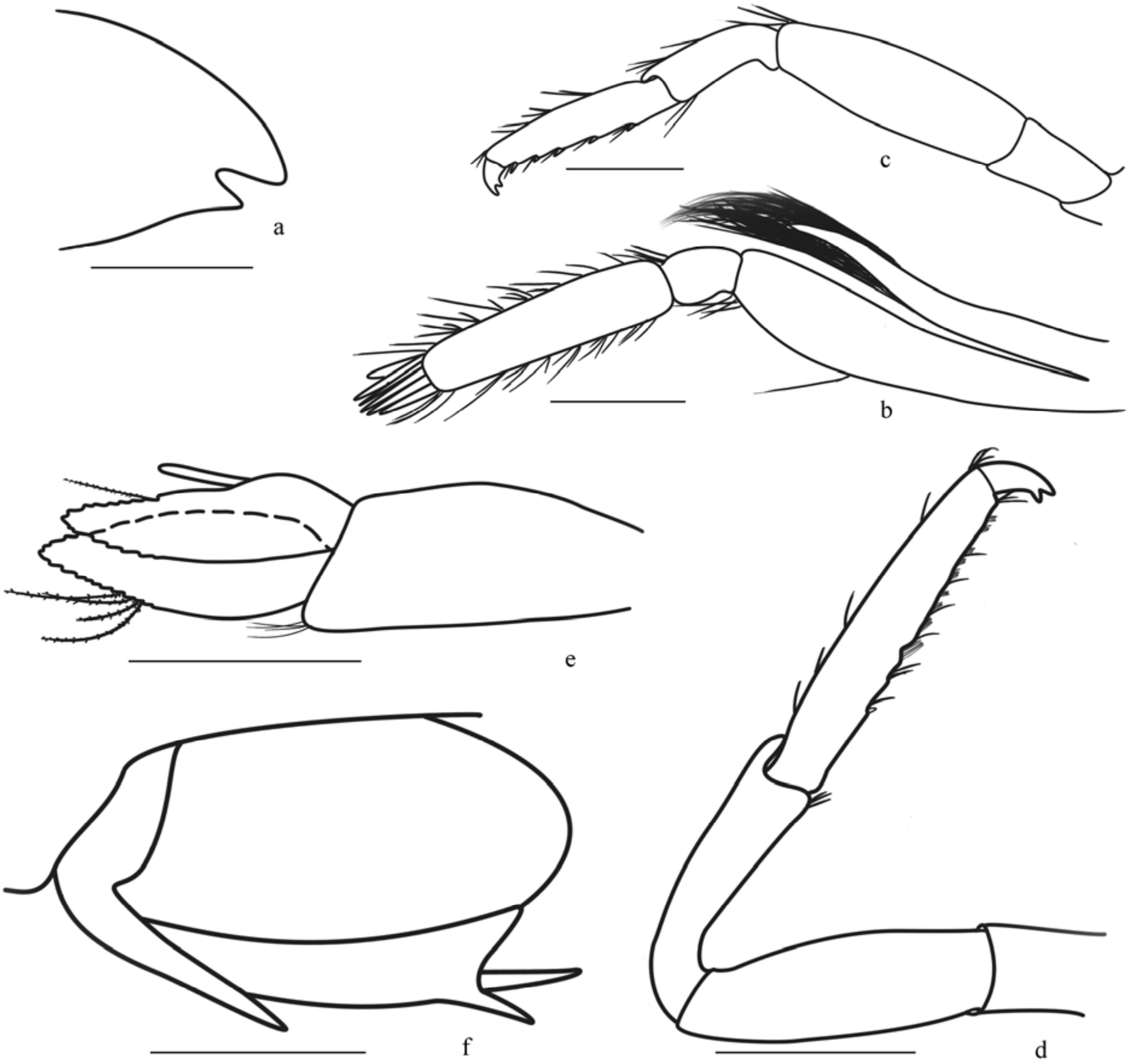

Fig. 28. *Synalpheus liui* **sp. nov.** male (cl 3.2 mm) (MBM 283382). a. Distal of minor chela dactylus, lateral view. b. Left Third maxilliped, dorsal view. c. Left four pereiopod, lateral view. d. Left five pereiopod, lateral view. e. Left two pleopod. f. Left uropod. Scale bars: a = 0.2 mm; b–f = 0.5 mm.

Etymology. The specific name is in honor of Prof. J-Y Liu (Institute of Oceanology, Chinese Academy of Sciences).

Type locality. Zhubi Jiao, Nansha Islands.

Distribution. Zhubi Jiao, presently known only from the type locality in Nansha Island, South China Sea.

Remarks *Synalpheus liui* **sp. nov.** can be distinctly distinguished by following characters: posterolateral margin of sixth pleura each with 1 blunt tooth; the palm of major cheliped with superodistal margin produced into prominent tubercle with little subacute ventrally directed tooth; the longer distodorsal tooth of basicerite, which subequal to the stylocerite, and the longer tooth of uropods of protopodite, which was 1/2 length of outer uropod.

There are another 9 species in the Indo-Pacific waters with the posterior margin of the sixth pleura armed with 2, 3, 4 or 7 teeth, *S. septemspinosus* de Man, 1910 (7 teeth), *S. mortenseni* Banner & Banner, 1985 (7 teeth), *S. quadrispinosus* de Man, 1910 (4 teeth), *S. trispinosus* de Man, 1910 (3 teeth), *S. triacanthus* de Man, 1910 (3 teeth), *S. bispinosus* de Man, 1910 (2 teeth), *S. cretoculatus* Banner & Banner, 1979 (2 teeth), *S. sciro* Banner & Banner, 1975 (2 teeth) and *S. pescadorensis* Coutière, 1905 (2 teeth). The later four species show same number of teeth. However, the new species has the dactylus of minor chela excavate and denticulate, while tapering in *S. bispinosus* and *S. cretoculatus*.

S. liui **sp. nov.** is morphologically very similar to *S. sciro* and *S. pescadorensis* by following characters: orbital hoods subequal in length to rostrum, slightly upturned at tip and without orbitorostral process, dactylus and pollex of minor chela broadened and excavate to tip, dactylus of the third pereiopod, extensor tooth longer than flexor, and thicker at base than flexor tooth, and dorsal surface of telson all bearing two pairs of large moveable spines. But it can easily be distinguished from *S. sciro* by following: protopodite of uropods with tooth about 1/2 length of outer uropod rather than usual 1/3 length of outer uropod, distodorsal tooth of basicerite subequal to stylocerite rather than distinctly shorter than stylocerite, second pereiopod with the first segment of carpus little shorter than the sum of four following rather than little longer. *S. liui* **sp. nov.** is different from *S. pescadorensis* by following: distolateral tooth of basicerite reaching to middle of second antennular segment rather than end of first antennular segment; distodorsal tooth hardly reaching end of first antennular segment rather than half as long as inferior tooth, merus of major and minor chela with superodistal margin bearing acute triangular tooth rather than without any projecting, and tips of third maxilliped bearing crown of 5–6 spine-like long setae rather than only setae.

3.2.16 *Synalpheus lophodactylus* Coutière, 1908* (Fig. 29)

Synalpheus lophodactylus Coutière, 1908. *Bull. Soc. Philomath, Parish IX*, 11(5): 197; 1921. *Trans. Linn. Soc. Lond., Zool. Lond.* 11, *Zool.* 14, 17: 417. pl. 61, fig. 11; Banner, 1957. *Pacif. Sci.*, 11(2): 195; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 350, fig. 20.

Material examined. (MBM 158724), 2♀, 1♂, CL 3.9 mm, TL 8.1 mm, Shalao, South China Sea, depth 2 m, 4 April 1992.

Description. Carapace smooth, glabrous; rostrum about 2.5 as long as wide at base, rounded tip bearing two short setae, reaching end of visible part of first segment of antennular peduncle; orbital hoods about 2.4 times as wide at base as rostrum, shorter than rostrum, with rounded tip bearing two short setae; pterygostomial corner produced into blunt acute angle; cardiac notch well developed.

Telson about 1.2 times as long as wide at base; dorsal surface with two pairs of moderately large spines, inserted approximately at 1/3 and 3/5 length of telson; posterior margin moderately produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral 1/3 length of mesial, posterolateral margins each produced into acute small tooth, distinctly shorter than lateral spines.

Eyes concealed in lateral and dorsal view.

Antennular peduncle stout, with distally acute stylocerite, latter hardly reaching end of first segment of antennular peduncle; second segment almost as long as wide; visible part of first segment longer than second and about twice as long as third. Basicerite without distodorsal tooth, distolateral tooth reaching middle of second segment of antennular, distinctly longer than stylocerite; carpocerite beyond end of antennular peduncle by total length of third segment; scaphocerite blade narrow, not reaching end of third segment of antennular peduncle, lateral spine developed, reaching end of antennular peduncle, shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.5 times as long as wide at base; tip of ultimate segment bearing three spine-like setae, with transverse rows of setae along ventral margin.

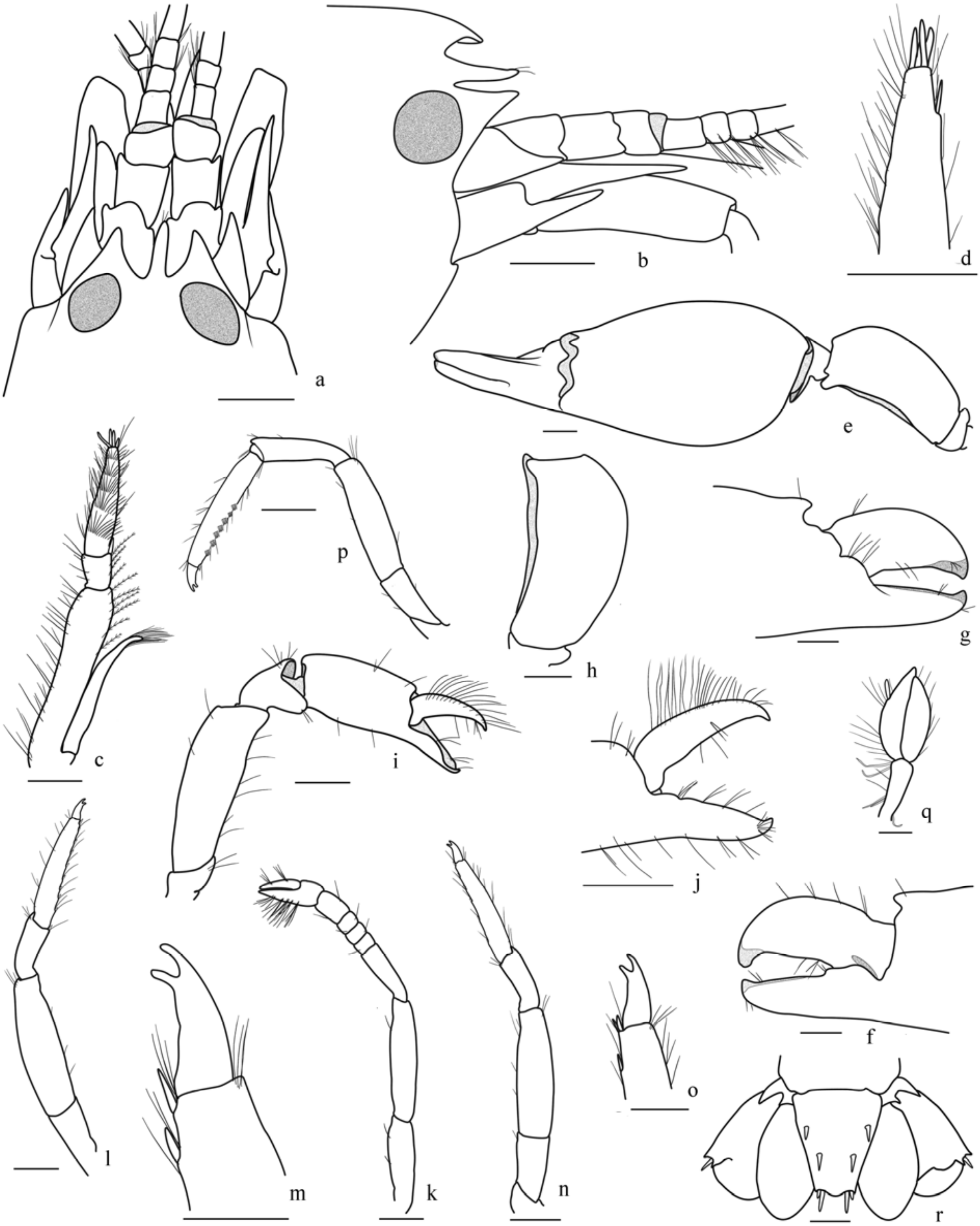

Fig. 29. *Synalpheus lophodactylus* Coutière, 1908, female (cl 3.9 mm) (MBM 158724). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Ventral. d. Tip, dorsal. e–h. Major cheliped (left). e. Mesial. f–g. Chela, lateral. h. Merus, lateral. i–j. Minor cheliped (right). i. Lateral. j. Chela, mesial. k. Second pereiopod, lateral. l–m. Third pereiopod. l. Lateral. m. Distal propodus and dactylus, lateral. n–o. Fourth pereiopod. n. Lateral. o. Distal propodus and dactylus, lateral. p. Fifth pereiopod, lateral. q. Second pleopod. r. Telson and uropod, dorsal. Scale bars: a–l, n, p–r = 0.5 mm; m, o = 0.2 mm.

Major cheliped with short, stout ischium; merus about three times as long as wide at base, with dorsal margin convex medially, superodistal margin without triangular tooth; carpus cup-shaped, with setae distodorsally; chela cylindrical, with palm about 1.7 times as long as dactylus, distodorsal of palm with one triangular tubercle, slightly upturned, bearing fine setae; dactylus as long as pollex.

Minor chela with merus about 2.8 as long as wide, longer than that of major cheliped, superodistal margin without any projecting, ventral margin bearing short setae; carpus cup-shaped, proportionally longer that of major cheliped, about 1/2 length of palm; palm about 1.2 times as long as fingers; dactylus tapering, superior surface bearing row of long setae, extending almost full length of dactylus; pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 5: 1: 1: 1: 3, with first segment shorter than sum of last four segment; dorsal margin of palm convex; fingers about twice as long as palm. Third pereiopod stout; merus longer than propodus, about 4 times as long as wide at base; carpus about 1/2 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with eight spines along ventral margin plus one distal pair of spines near dactylus, dorsal margin with fine setae; dactylus around 1/5 propodus length, biunguiculate, extensor tooth as long as flexor tooth, and as wide at base as flexor tooth, notch between extensor and flexor tooth U-shaped. Fourth pereiopod generally similar to third; ventral margin of carpus without distal spine. Fifth pereiopod similar to third and fourth pereiopods, carpus about 4/5 merus length, ventral margin without distal spine; propodus slightly longer than merus, with seven transversal rows of setae and distally pair of spines on ventral margin.

Remarks. *S. lophodactylus* was originally described by Coutière (1908), based on a male specimen. The description was rather simple and without figures. Coutière (1921) rechecked the holotype and added figures (pl. 61, fig.11). Unfortunately, the major chela was lost. Banner & Banner (1975) rechecked the type at the Muséum d'Histoire Naturelle in Paris, and redescribed this species based on more than 200 specimens. The redescriptions were well agreed with Coutière (1921), except the following characters: the length of the distolateral tooth of basicerite; the length of the brush of setae on the superior margin of dactylus (minor chela), which are taken as variable in this genus. However, the minor chela has lost when Banner rechecked the type.

All present specimens are small in size, collected from South China Sea in a depth 2 meters, agreed with the redescription of Banner & Banner (1975).

Distribution. South China Sea; Chagos Archipelago; Indian Ocean; Marshall Islands; Australian.

3.2.17 *Synalpheus modestus* de Man, 1909* (Fig. 30)

Synalpheus modestus de Man, 1909. *Tijdschr. ned. dierk. Vereen*, 11(2): 115, fig. 31; Banner & Banner, 1985. *Marine Research in Indonesia*: pl. 46.

Material examined. (MBM 158475), 1 ovigerous ♀, CL 4.1 mm, TL 10.2 mm, Xincun, depth 1–3 m, 26 March 1992; (MBM 159310), 1♂, CL 3.5 mm, TL 8.9 mm; (MBM 159278), 2 ovigerous ♀, 3♂, CL 3.1–3.9 mm, TL 8.1–10.2 mm; (MBM 159244), 1♂; (MBM 107778), 2♂, CL 3.4 mm, TL 8.9 mm, Shalao, South China Sea, depth 6 m, coll. Xin-Zheng Li; (MBM 158542), Xincun, depth 1–3 m, 26 March 1992.

Description. Carapace smooth, glabrous; rostrum about 4.2 times as long as wide at base, acute tip reaching middle of second segment of antennular peduncle; orbital hoods distinctly shorter than rostrum, not reaching end of first segment of antennular peduncle; pterygostomial corner produced into acute angle; cardiac notch well developed.

Telson about 1.3 times as long as wide at base; dorsal surface with two pairs of moderately small spines, inserted approximately at 2/5 and 3/5 length of telson; posterior margin strongly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/4 length of mesial, posterolateral margins each produced into acute small tooth, but distinctly shorter than lateral spines.

Eyes concealed in lateral and dorsal view.

Antennular peduncle slender, with distally acute stylocerite, latter overreaching middle of second segment of antennular peduncle; second segment about 1.25 times as long as wide at base; visible part of first segment longer than second and about twice as long as third. Basicerite with acute distodorsal tooth, distolateral tooth distinctly shorter than stylocerite, reaching end of first segment of antennular peduncle; carpocerite overreaching end of third segment of antennular peduncle; scaphocerite blade moderately narrow, reaching about 3/4 length of third segment of antennular peduncle, lateral spine developed, far overreaching end of antennular peduncle, distinctly longer than carpocerite.

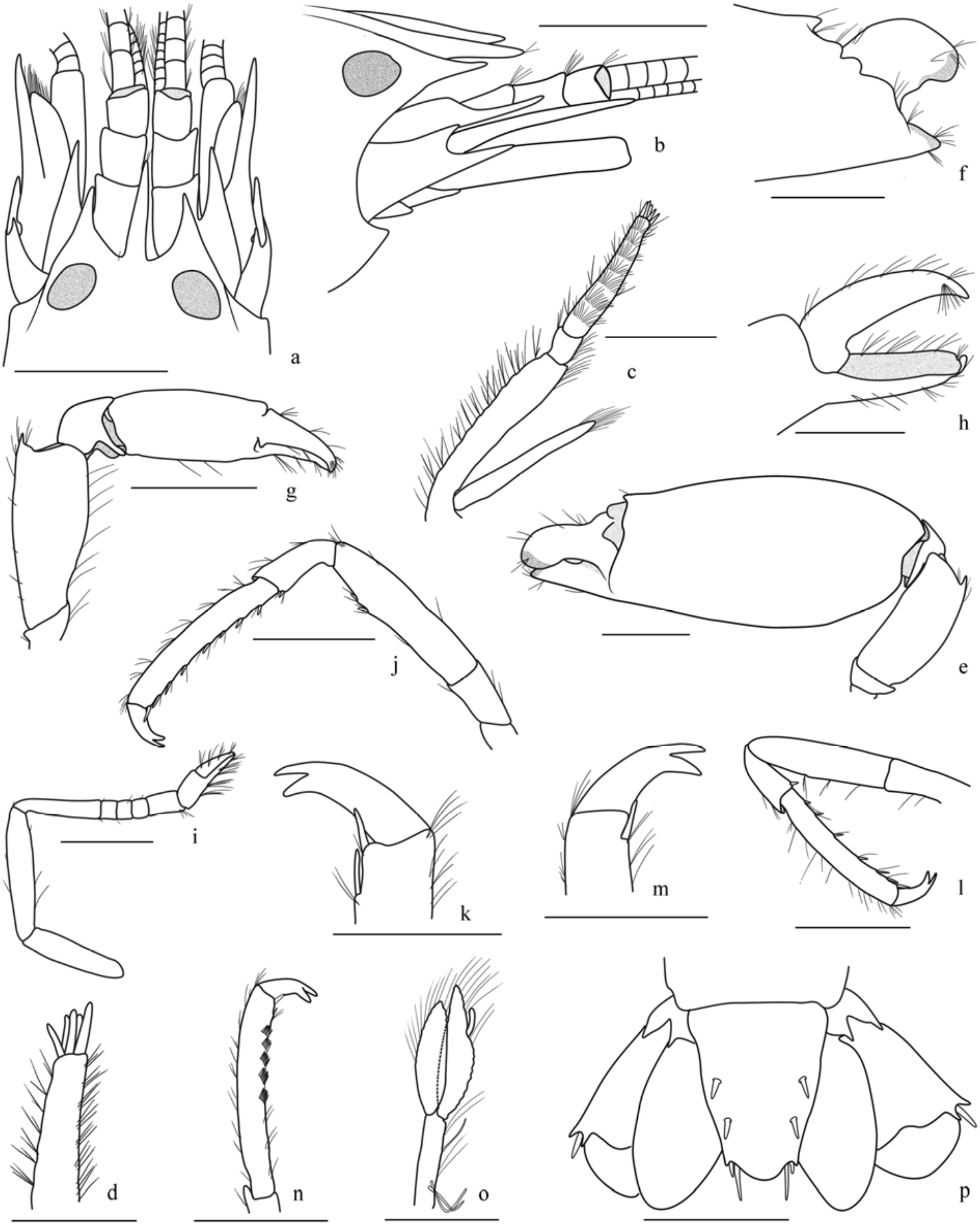

Fig. 30. *Synalpheus modestus* de Man, 1909, female (cl 4.1 mm) (MBM 158475). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Ventral. d. Tip, dorsal. e–f. Major cheliped (left). e. Mesial. f. Chela, lateral. g–h. Minor cheliped (right). g. Lateral. h. Chela, mesial. i. Second pereiopod, lateral. j–k. Third pereiopod. j. Lateral. k. Distal propodus and dactylus, lateral. l–m. Fourth pereiopod. l. Lateral. m. Distal propodus and dactylus, lateral. n. Fifth pereiopod, propodus and dactylus, lateral. o. Second pleopod. p. Telson and uropod, dorsal. Scale bars: a–c, e–g, i–j, l, o–p = 1 mm; d, h, k, m–n = 0.5 mm.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.4 times as long as wide at base; tip of ultimate segment bearing crown of moderately long five spine-like setae, with transverse rows of long setae along ventral margin.

Major cheliped with short, stout ischium; merus about three times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, with setae distodorsally; palm about 2.9 times as long as dactylus, distodorsal of palm with one strong subacute projecting; dactylus slightly longer than pollex.

Minor chela with merus about 3.5 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.7 times as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 5:1:1:1:2.2, with first segment slightly shorter than sum of last four segment; dorsal margin of palm convex; fingers about 1.2 times as long as palm. Third pereiopod moderately slender; merus near as long as propodus, about 4 times as long as wide at base, ventral margin with 2 spines; carpus about 2/5 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with seven spines along ventral margin plus one distal pair of spines near dactylus; dactylus about 3/11 length of propodus, slightly curved to propodus, biunguiculate, extensor tooth near as long as flexor tooth, notch between extensor and flexor tooth V-shaped, flexor tooth wider at base than extensor tooth. Fourth pereiopod generally similar to third; merus shorter than propodus, ventral margin of propodus with six spines. Fifth pereiopod similar to third and fourth pereiopod, ventral margin of carpus without one distal spine; ventral margin of propodus with five transversal rows of spine-like setae and two spines.

Remarks. De Man (1909) described this species based on single specimen. It was morphologically “closely related to *S. streptodactylus*”. Banner & Banner (1985) had ever discussed the validity of the species, and considered the slender rostrum of this species to be unique in this genus. The slender rostrum is most similar to another the Indo-Pacific species, *S. gracilirostris* de Man, 1910, which can be easily distinguished by the spines on the merus of the third pereiopod.

The species is also different from *S. streptodactylus* Coutière, 1905 by the slender rostrum, the projecting situated on the distal-superior margin of the palm in the major chela subacute.

Distribution. Xincun, South China Sea; Banda Reef.

3.2.18 *Synalpheus mortenseni* Banner & Banner, 1985* (Figs 31–32)

Synalpheus mortenseni Banner & Banner, 1985. *Marine Research in Indonesia*: 47, fig. 5.

Material examined. (MBM 270604), 1♀, CL 5.4 mm, TL 14.3 mm, Tonkin Gulf (Beibu Gulf), Sta. 6229, depth 41 m, 8 July 1960.

Description. Carapace smooth, glabrous; rostrum twice as long as wide at base, with lateral margins slightly convex, rounded tip bearing two short setae, overreaching 1/2 length of visible part of first segment of antennular peduncle; orbital hoods about 2.6 times as wide at base as rostrum, equal to rostrum, with rounded tip bearing two short setae; both rostrum and orbital hoods tips upturned; notches between orbital hoods and rostrum deep, narrow, V-shaped; pterygostomial corner produced into blunt acute angle; cardiac notch well developed.

Abdominal somites smooth, glabrous, posterolateral margin of sixth pleura each with one triangular tooth, margin between two teeth bearing eight subacute teeth; first-fifth pleura of male with posterior corner rounded. Telson as long as wide at base; lateral margin slightly concave posteriorly; dorsal surface without median groove, with two pairs of large spines, inserted approximately at 1/3 and 3/5 length of telson; posterior margin strongly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral 2/3 length of mesial, posterolateral margins each produced into acute tooth, but shorter than lateral spines.

Eyes concealed in lateral and dorsal view.

Antennular peduncle slender, with distally acute stylocerite, latter hardly reaching middle of second segment of antennular peduncle; second segment 1.25 times as long as wide; visible part of first segment slightly longer than second and about twice as long as third. Antenna with basicerite with acute distodorsal tooth, about 1/2 length of distolateral tooth, latter overreaching end of first segment, slightly shorter than stylocerite; carpocerite beyond end of antennular peduncle by 1/4 length of third segment; scaphocerite blade narrow, hardly reaching end of third segment of antennular peduncle, lateral spine developed, with lateral margin slightly concave posteriorly, overreaching end of antennular peduncle, slightly shorter than carpocerite.

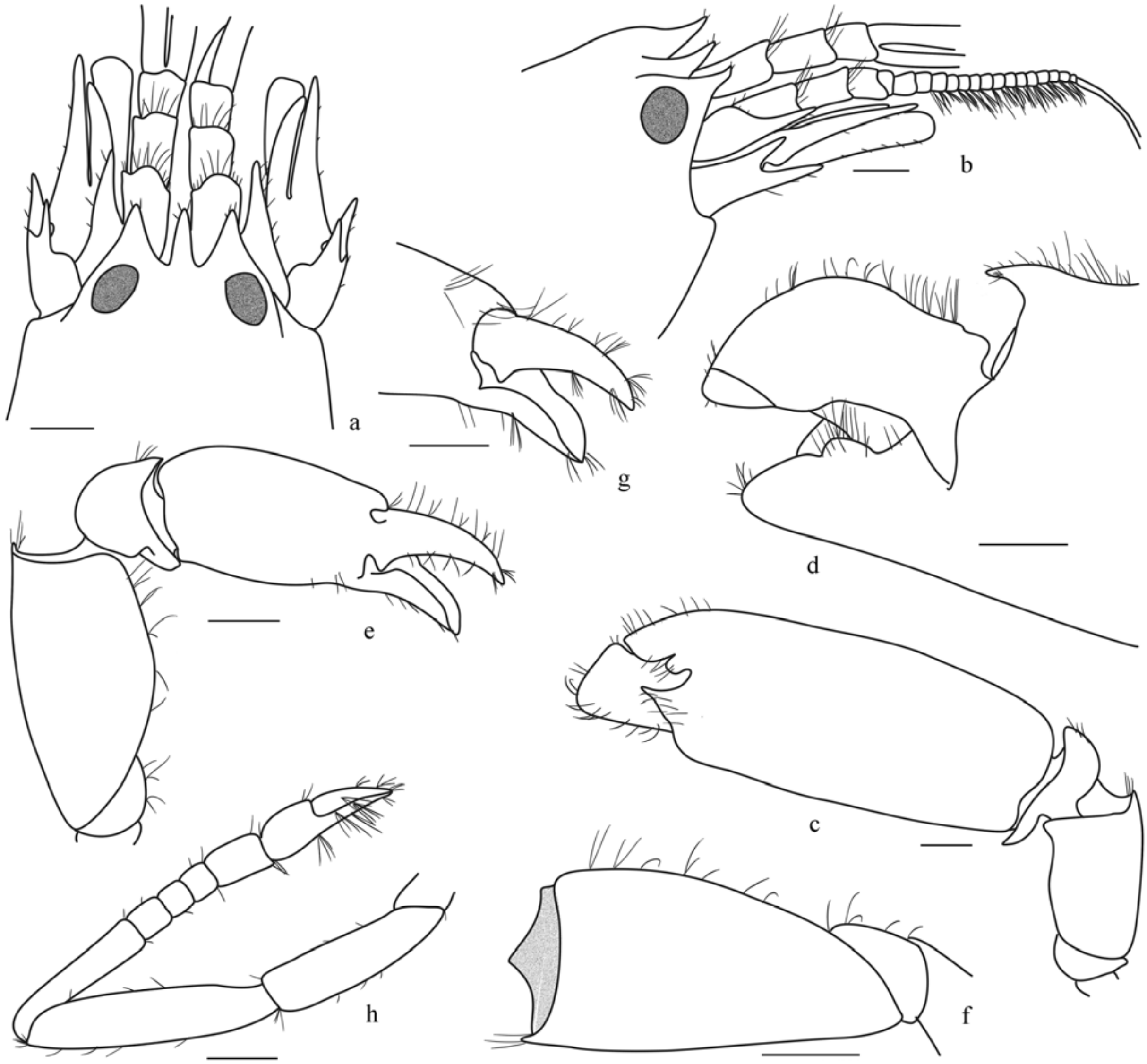

Fig. 31. *Synalpheus mortenseni* Banner & Banner, 1985, male (cl 5.4 mm) (MBM 270604). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Major cheliped. c. Chela, mesial. d. Lateral. e–g. Minor cheliped. e. Mesial. f. Merus. g. Chela. h. Second pereiopod, lateral. Scale bars = 0.5 mm.

Mouthpart not dissected. Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest, about five times as long as wide; penultimate segment as long as wide at base; tip of ultimate segment bearing crown of five spine-like long setae, with several brush consisting of 6–8 transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus 1.6 times as long as wide at base, with ventral margin convex medially, superodistal margin ending in subacute triangular tooth; carpus cup-shaped, with long setae distodorsally; chela cylindrical, not a bit compressed or twisted, with palm about 2.8 times as long as dactylus, distodorsal of palm with swollen tubercle, bearing in turn a smaller distinct and acute tooth; dactylus slightly longer than pollex.

Minor chela with merus about twice as long as wide, longer than that of major cheliped, superodistal margin with subacute triangular tooth, ventral margin bearing short setae; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.5 times as long as fingers; dactylus tapering, with flexor margin concave, distal single tooth; pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 5 : 1 : 1 : 1 : 2, with first segment equal to sum of last four segment; dorsal margin of palm convex; fingers 1.5 times as long as palm. Third pereiopod stout; merus longer than propodus, about 3.8 times as long as wide at base, without spines on ventral margin; carpus about 1/3 merus length, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with usual seven spines along ventral margin plus one distal pair of spines near dactylus; dactylus around 1/5 propodus length, triunguiculate, extensor tooth smallest, about 1/3 length of medial tooth, medial tooth five times as

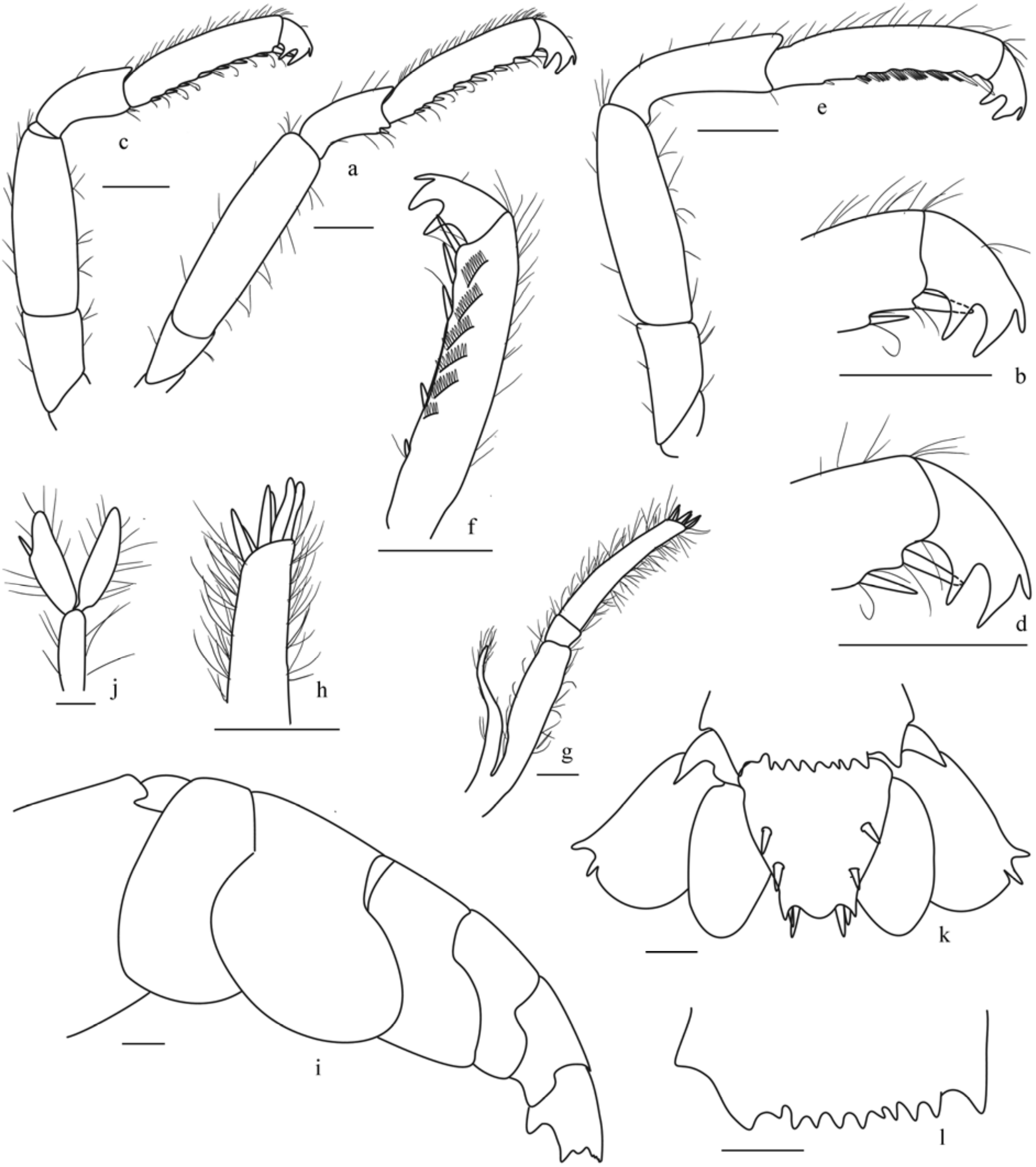

Fig. 32. *Synalpheus mortenseni* Banner & Banner, 1985. a–b. Third pereiopod. a. Lateral. b. Distal propodus and dactylus, lateral. c–d. Fourth pereiopod. c. Lateral. d. Distal propodus and dactylus, lateral. e–f. Fifth pereiopod. e. Lateral. f. Propodus and dactylus, ventral. g–h. Third maxilliped. g. Dorsal. h. Tip, dorsal. i. Abdomen, lateral. j. Second pleopod. k. Telson and uropod, dorsal. l. Posterior margin of sixth abdominal somite. Scale bars = 0.5 mm.

wide at base as extensor tooth, notch between extensor and medial tooth V-shaped; flexor tooth slightly shorter than medial tooth, 6/7 width at base of medial tooth, notch between medial and flexor tooth U-shaped. Fourth pereiopod generally similar to third; ventral margin of carpus with one distal spine. Fifth pereiopod similar to third and fourth pereiopods, but ventral margin of carpus without distal spine, with merus about 2.7 times as long as wide; carpus about 3/4 merus length, ventral margin without distal spine; propodus as long as merus, with six transversal rows of setae and five spines along ventral margin.

Remarks. The species is original described by Banner & Banner (1985), based on 13 specimens. The holotype, a ovigerous female, was collected from Kei Islands, Ambon, in a depth 13–18 m. The description is intact, and the variations between the specimens were also well discussed. They also discussed the differences between *S. mortenseni* and other six species (*S. triunguiculatus*, *S. demani*, *S. trionyx*, *S. nilandensis*, *S. fossor*, *S. heroni*).

Another species, *S. septemspinosus* de Man, 1910, also bears 7 spines on the posterior margin of the sixth abdominal somite, but it can be well distinguished from *S. mortenseni* by the merus of third pereiopod, which bears several spines along the ventral margin of the third pereiopods.

The present specimen is an ovigerous female collected from Tonkin Gulf (Beibu Gulf), in a depth 41 meters. The specimen is agreed well with the description of the holotype, except the number of the spines of the posterior margin of sixth abdominal somite, but this character was variable in *S. mortenseni*, as discussed in the original description (Banner & Banner, 1985).

Distribution. Tonkin Gulf (Beibu Gulf), South China Sea; Ambon, Indonesia.

3.2.19 *Synalpheus neomeris* (de Man, 1897) (Figs 33–34)

Alpheus minor neptunus de Man, 1888. *J. Linn. Soc. Lond.*, 22: 272 (nec *A. minor* Rankin = *A. minus* Say; nec *A. neptunus* Dana).

Alpheus neomeris de Man, 1897. *Zool. Jb. Syst.*, 9: 734, fig. 61a, d, e (*partim*).

Synalpheus neomeris Coutière, 1905. *Fauna and Geog. Maid, and Laccad.*, 2(4): 869, fig. 1; de Man, 1911. *Siboga Exped*, 39(2): 212, fig. 24; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 357, fig. 22.

Synalpheus gravieri Coutière, 1905. *Fauna and Geog. Maid, and Laccad.*, 2(4): 870, fig. 2; Pearson, 1905. *Rep. Govt. Ceylon Pearl Oyster Fish. Gulf Manaar*, 4(24): 82; de Man, 1911. *Siboga Exped.*, 39(2): 216, fig. 25; Gurney, 1927. *Trans. Zool. Soc. Fond.*, 22: 261, fig. 64 (larval development); Banner & Banner, 1966. *Siam Soc. Mono.*, 3: 48, fig. 13; Miya, 1972. *Publ. Amakusa Biol. Lab.*, 3(1): 66, pl. 13.

Alpheus prolificus Ortmann, 1890. *Zool. Jb. Syst.*, 5: 484 (nec Spence Bate).

Alpheus neptunus Spence Bate, 1888. *Challenger Rept.*, 24: 563, pl. 101, fig. 2 (nec *A. neptunus* Dana).

Material examined. CL 5.9–13.1 mm, TL 15.1–30.1 mm. (MBM 270310), 2 ovigerous ♀, 2♂, depth 60 m; (MBM 270380), 1 ovigerous ♀, 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6179, depth 16 m, 13 February 1960, coll. Fu-Zeng Sun; (MBM 270379), 1 ovigerous ♀, 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6251, depth 51 m, 9 October 1960, coll. Shou-Peng Shen; (MBM 270378), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6267, depth 35 m, 10 February 1960, coll. Fu-Zeng Sun; (MBM 270376), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6273, depth 46 m, 25 October 1960, coll. Shou-Peng Shen; (MBM 270375), 1 ovigerous ♀, 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6273, depth 46 m, 25 October 1960, coll. Shou-Peng Shen; (MBM 270374), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6263, depth 59 m, 19 October 1960, coll. Shao; (MBM 270373), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6249, depth 35 m, 14 April 1960, coll. Fu-Zeng Sun; (MBM 270561), 1 ovigerous ♀, Tonkin Gulf (Beibu Gulf), Sta. 6237, depth 45.5 m, 13 December 1959, coll. Fu-Zeng Sun; (MBM 270439), 2 ovigerous ♀, 7♂, Tonkin Gulf (Beibu Gulf), Sta. 6280, depth 27 m, 5 December 1959, coll. Xiu-Tong Ma; (MBM 270568), 4 immature specimens, Tonkin Gulf (Beibu Gulf), Sta. 6277, depth 31.3 m, 17 May 1960, coll. Zhen-Gang Fan; (MBM 270403), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6270, depth 32.8 m, 7 July 1960, coll. Zhen-Gang Fan; (MBM 270417), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6249, depth 35 m, 14 April 1960, coll. Fu-Zeng Sun; (MBM 270418), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6223, depth 30 m, 20 May 1960, coll. Fu-Zeng Sun; (MBM 270421), 3♂, Tonkin Gulf (Beibu Gulf), Sta. 7404, depth 46 m, 15 April 1962, coll. Fu-Zeng Sun; (MBM 270420), 1 ovigerous ♀, 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7404, depth 48 m, 21 August 1962; (MBM 270238), 1 ovigerous ♀, 7♂, Tonkin Gulf (Beibu Gulf), Sta. 6239, depth 63.3 m, 4 December 1959; (MBM 270420), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7404, depth 48 m, 21 August 1962; (MBM 107834), 1 ovigerous ♀, 1♂, East China Sea, Sta. V-3, depth 130 m, 29 August 1976, coll. Zhi-Chan Tang; (MBM 107831), 1♂, East China Sea, Sta. IV-6, depth 112 m, 29 August 1976, coll. Rui-Yu Liu; (MBM 107835), 3♂, East China Sea, Sta. V-7, depth 126 m, 21 September 1976, coll. Zhi-Chan Tang, Feng-Shan Xu; (MBM 270202), 1 ovigerous ♀, 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6262, depth 48 m, 15 October 1960, coll. Shou-Peng Shen; (MBM 270382), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6251, depth 50 m, 6 July 1960, coll. Zhen-Gang Fan; (MBM 270370), 1♂; (MBM 270369), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6179, depth 15 m, 14 July 1960, coll. Shou-Peng Shen; (MBM 270368), 1 ovigerous ♀, 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6249, 11 November 1960, coll. Bao-Lin Zhang; (MBM 270367), 1 ovigerous ♀, 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6249, 11 November 1960, coll. Bao-Lin Zhang; (MBM 270366), 2 ovigerous ♀, 4♂, Tonkin Gulf (Beibu Gulf), Sta. 6249, 11 November 1960, coll. Bao-Lin Zhang; (MBM 270365), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6249, depth 33.5 m, 13 April 1960, coll. Fu-Zeng Sun; (MBM 270364), 2 ovigerous ♀, 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6249, depth 33.5 m, 13 April 1960, coll. Fu-Zeng Sun; (MBM 270448), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6271, depth 44 m, 17 May 1960, coll. Zhen-Gang Fan; (MBM 270381), 5♂, Tonkin Gulf (Beibu Gulf), Sta. 6251, depth 50 m, 6 July 1960, coll. Zhen-Gang Fan; (MBM 270419), 4 ovigerous ♀, 5♂, Tonkin Gulf (Beibu Gulf), Sta. 7304, 21 January 1962, coll. Fu-Zeng Sun; (MBM 270419), 1 ovigerous ♀, 5♂, Tonkin Gulf (Beibu Gulf), Sta. 7304, depth 50 m, 20 August 1962, coll. Fu-Zeng Sun; (MBM 270401), 1♂, 2 immature specimens, Tonkin Gulf (Beibu Gulf), Sta. 6239, depth 57 m, 5 February 1960, coll. Zhen-Gang Fan; (MBM 270563), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6230, depth 64 m, 18 April 1960, coll. Zhen-Gang Fan; (MBM 270397), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6270, depth 32.8 m, 7 July 1960, coll. Zhen-Gang Fan; (MBM 270400), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6217, depth 60 m, 9 February 1960, coll. Fu-Zeng Sun; (MBM 270530), 1 ovigerous ♀, 2♂, Tonkin Gulf (Beibu Gulf), Sta. 7305, depth 64 m, 18 October 1962; (MBM 270402), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6240, depth 60 m, 6 December 1959, coll. Zhen-Gang Fan; (MBM 270398), 1 ovigerous ♀, 3♂, Tonkin Gulf (Beibu Gulf), Sta. 6222, depth 25 m, 18 October 1960, coll. Yang-Lian Guan; (MBM 270560), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6257, depth 64 m, 19 April 1960, coll. Zhen-Gang Fan; (MBM 27569), 2 ovigerous ♀, 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6276, depth 26 m, 7 July 1960, coll. Shou-Peng Shen; (MBM 270670), 1 ovigerous ♀, Tonkin Gulf (Beibu Gulf), Sta. 6232, depth 81 m, 23 October 1960, coll. Shou-Peng Shen; (MBM 270567), 1 ovigerous ♀, 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6250, depth 33.5 m, 13 April 1960, coll. Fu-Zeng Sun; (MBM 270565), 1 ovigerous ♀, Tonkin Gulf (Beibu Gulf), Sta. 6265, depth 63 m, 24 October 1960, coll. Xing; (MBM 270566), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6236, depth 41.5 m, 15 July 1960, coll. Fu-Zeng Sun; (MBM 081142), 1♂, East China Sea, Sta. 4081, depth 81 m, 2 February 1959, coll. Jie-Shan Xu; (MBM 270529), 1 ovigerous ♀, 5♂, Tonkin Gulf (Beibu Gulf), Sta. 7603, depth 43 m, 11 October 1959; (MBM 270526), 1 ovigerous ♀, 5♂, Tonkin Gulf (Beibu Gulf), Sta. 7503, depth 52 m, 22 August 1962; (MBM 270562), 1 ovigerous ♀, Tonkin Gulf (Beibu Gulf), Sta. 6283, depth 25 m, 10 July 1960, coll. Zhen-Gang Fan; (MBM 270564), 1 ovigerous ♀, Tonkin Gulf (Beibu Gulf), Sta. 6239, depth 63.3 m, 4 December 1959, coll. Zhen-Gang Fan; (MBM 270471), 3 ovigerous ♀, 5♂, Tonkin Gulf (Beibu Gulf), Sta. 7503, depth 47 m, 15 January 1962, coll. Fu-Zeng Sun; (MBM 270140), 1 ovigerous ♀, 16♂, Tonkin Gulf (Beibu Gulf), Sta. 7405, depth 60 m, 14 January 1962, coll. Fu-Zeng Sun; (MBM 270138), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6179, depth 14 m, 17 April 1960, coll. Fu-Zeng Sun; (MBM 270133), 1 ovigerous ♀, Tonkin Gulf (Beibu Gulf), Sta. 7404, depth 58 m, 14 January 1962, coll. Fu-Zeng Sun; (MBM 270131), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7204, depth 49 m, 22 January 1962, coll. Fu-Zeng Sun; (MBM 270130), 1 ovigerous ♀, 10♂, Tonkin Gulf (Beibu Gulf), Sta. 7304, depth 54 m, 21 January 1962, coll. Fu-Zeng Sun; (MBM 270135), 2 ovigerous ♀, 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7502, depth 32 m, 21 August 1962, coll. Fu-Zeng Sun; (MBM 270136), 2 ovigerous ♀, 2♂, 1 immature specimens, Tonkin Gulf (Beibu Gulf), Sta. 7405, depth 60 m, 14 January 1962, coll. Fu-Zeng Sun; (MBM 270137), 5♂, Tonkin Gulf (Beibu Gulf), Sta. 7404, depth 58 m, 14 January 1962, coll. Fu-Zeng Sun; (MBM 270139), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 7405, depth 63 m, 12 October 1962; (MBM 270590), 1 ovigerous ♀, 4♂, Tonkin Gulf (Beibu Gulf), Sta. 6249, depth 31 m, 7 November 1960, coll. Bao-Lin Zhang; (MBM 107830), 2 ovigerous ♀, 3 immature ♂, East China Sea, Sta. V-6, depth 112 m, 5 July 1976, coll. Bao-Lin Zhang, Feng-Shan Xu; (MBM 107833), 2♂, East China Sea, Sta. V-2, depth 99 m, 5 July 1976, coll. Zhi-Chan Tang; (MBM 107832), 1♂, 1 immature specimens, East China Sea, Sta. V-7, depth 100 m, 10 October 1975, coll. Zhi-Chan Tang, Jie-Shan Xu; (MBM 107829), 1 ovigerous ♀, East China Sea, Sta. III-7, depth 100 m, 27 June 1976, coll. Zhi-Chan Tang; (MBM 107827), 1♂, East China Sea, Sta. VI-4, depth 139 m, 29 August 1976, coll. Zhi-Chan Tang; (MBM 270596), 4♂, Tonkin Gulf (Beibu Gulf), Sta. 6218, depth 31 m, 4 November 1960, coll. Bao-Lin Zhang; (MBM 107828), 1 ovigerous female, East China Sea, Sta. V-5, depth 150 m, 28 August 1976, coll. Zhi-Chan Tang, Bao-Lin Zhang; (MBM 270593), 13♂, Tonkin Gulf (Beibu Gulf), Sta. 6266, depth 50.5 m, 13 July 1960, coll. Zhen-Gang Fan, Shou-Peng Shen; (MBM 107836), 5 ovigerous ♀, 7♂, East China Sea, Sta. V-3, depth 105 m, 27 August 1976, coll. Zhi-Chan Tang; (MBM 270195), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7604, depth 58 m, 11 October 1962; (MBM 270592), 8 ovigerous ♀, 12♂, 8 immature specimens, Tonkin Gulf (Beibu Gulf), Sta. 6277, depth 35 m, 9 July 1960, coll. Zhen-Gang Fan; (MBM 270196), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7603, depth 42 m, 12 January 1962, coll. Fu-Zeng Sun; (MBM 042233), 5 specimens, East China Sea, Sta. 4082, depth 86 m, October 1959, coll. Rui-Yu Liu; (MBM 158504), 1 ovigerous ♀, Yezhu Island, depth 10 m, 18 March 1992, coll. Bao-Lin Zhang; (MBM

158690), 1♂, Nansha Islands, Sta. 55, depth 46 m, 8 June 1990; (MBM 158776), 1♂, Nansha, Islands, Sta. 15, 28 May 1985; (MBM 214610), 5♂, Tonkin Gulf (Beibu Gulf), Sta. 6236, depth 47.5 m, 18 April 1960, coll. Fu-Zeng Sun.

Description. Carapace smooth, glabrous; rostrum about 2.5 times as long as wide at base, acute tip reaching about 2/3 length of visible part of first segment of antennular peduncle; orbital hoods slightly shorter than rostrum; pterygostomial corner produced into acute angle; cardiac notch well developed.

Telson about 1.4 times as long as wide at base; dorsal surface with two pairs of moderately small spines, inserted approximately at 8/11 and 9/11 length of telson; posterior margin strongly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/2 length of mesial, posterolateral margins not produced.

Eyes concealed in lateral and dorsal view.

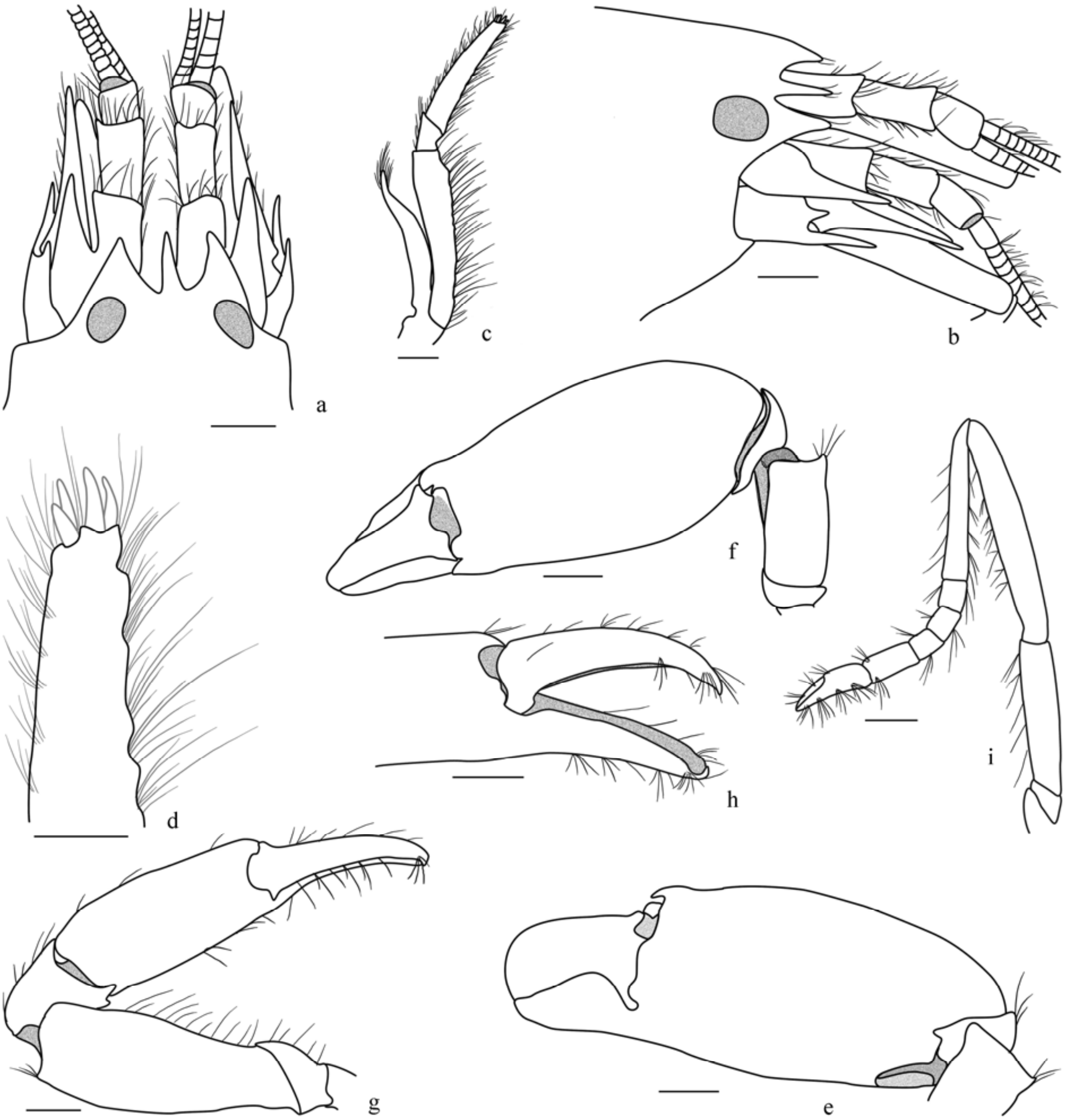

Fig. 33. *Synalpheus neomeris* (de Man, 1897), female (cl 7.5 mm) (MBM 279528). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Lateral. d. Tip, lateral. e–f. Major cheliped. e. Chela, mesial. f. Lateral. g–h. Minor cheliped. g. Lateral. h. Chela, mesial. i. Second pereiopod, lateral. Scale bars = 1 mm.

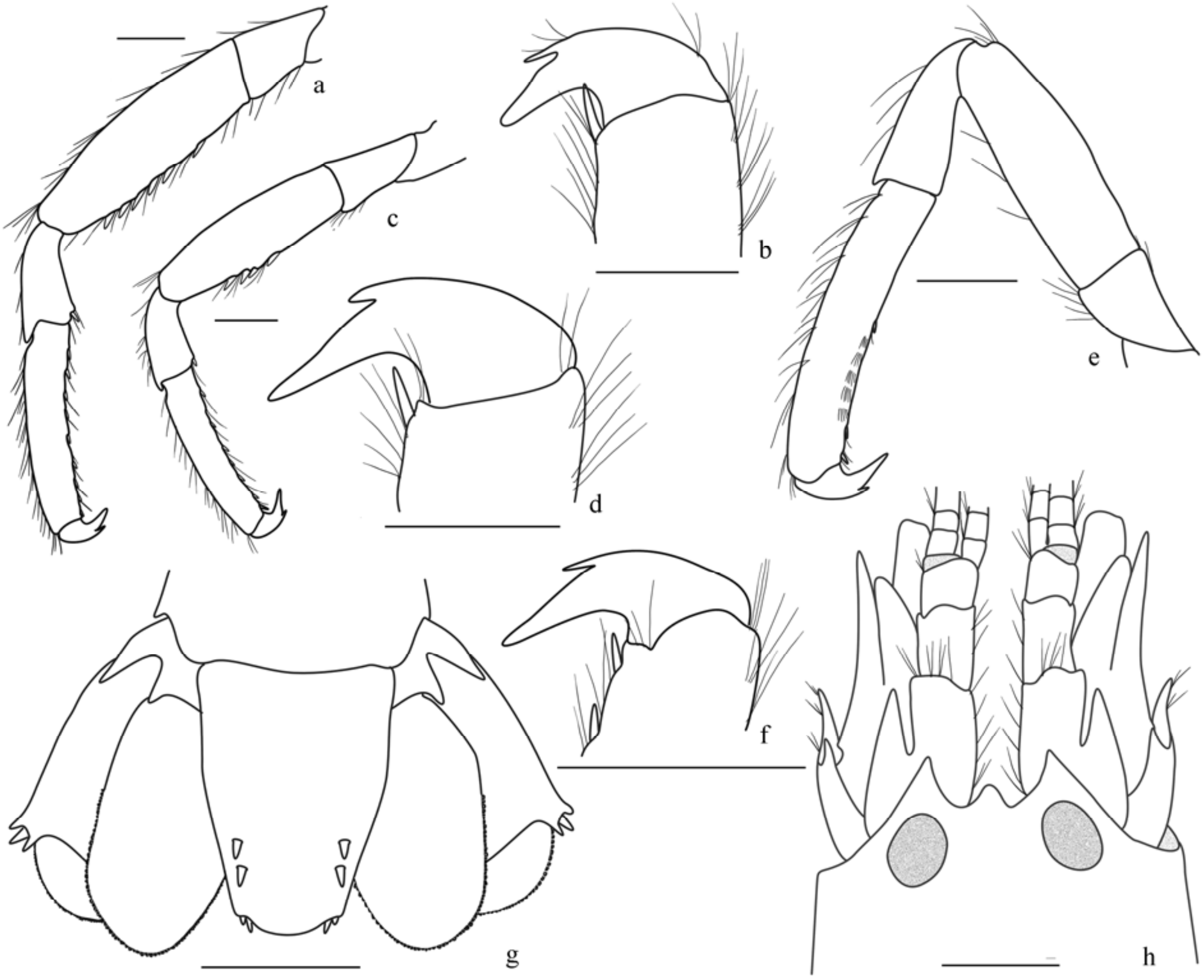

Fig. 34. *Synalpheus neomeris* (de Man, 1897). a–b. Third pereiopod. a. Lateral. b. Distal propodus and dactylus, lateral. c–d. Fourth pereiopod. c. Lateral. d. Distal propodus and dactylus, lateral. e–f. Fifth pereiopod. e. Lateral. f. Distal propodus and dactylus, lateral. g. Telson and uropod, dorsal. h. Female (cl 6.9 mm) (MBM 158504) frontal region, dorsal. Scale bars = 1 mm.

Antennular peduncle slender, with distally acute stylocerite, latter reaching about 1/4 length of second segment of antennular peduncle; second segment about 1.5 times as long as wide at base; visible part of first segment longer than second and about twice as long as third. Basicerite with acute distodorsal tooth, distolateral tooth slightly shorter than stylocerite; carpocerite far overreaching end of third segment of antennular peduncle; scaphocerite blade moderately narrow, reaching 3/4 length of third segment of antennular peduncle, lateral spine developed, reaching end of antennular peduncle, distinctly shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.5 times as long as wide at base; tip of ultimate segment bearing crown of small four spine-like setae, with transverse rows of long setae along ventral margin.

Major cheliped with short, stout ischium; merus about twice as long as wide at base, superodistal margin with one subacute triangular tooth; carpus cup-shaped, with setae distodorsally; palm about 2.4 times as long as dactylus, distodorsal of palm with one strong acute projecting, curved to dactylus; dactylus as long as pollex.

Minor chela with merus about four times as long as wide at base, superodistal margin with one subacute triangular tooth; carpus cup-shaped, proportionally longer that of major cheliped; palm about slightly longer than fingers; dactylus and pollex slightly compressed, tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 6 : 1 : 1 : 1 : 2, with first segment longer than sum of last four segment; dorsal margin of palm convex; fingers near as long as palm. Third pereiopod moderately stout; merus slightly longer than propodus, about 3.5 times as long as wide at base, ventral margin with 4–7 spines; carpus about 1/3 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with nine small spines along ventral margin plus one distal pair of spines near dactylus; dactylus about 2/7 length of propodus, strongly curved to propodus, biunguiculate, extensor tooth about 1/3 length of flexor tooth, notch between extensor and flexor tooth V-shaped, flexor tooth about 4–5 times as wide at base as extensor tooth. Fourth pereiopod generally similar to third; merus shorter than propodus, ventral margin of propodus with four spines. Fifth pereiopod similar to third and fourth pereiopod, ventral margin of propodus with five transversal rows of spine-like setae and three spines.

Remarks. *Synalpheus neomeris* was originally described by de Man (1897) under the genus *Alpheus*, based on two specimens. Banner & Banner (1975) well discussed the history of this species and synonymized *Synalpheus gravieri* Coutière, 1905. Then, Banner & Banner (1985) synonymized *S. miscellaneous* de Man, 1909 (based on a male specimen) as *S. neomeris*.

The species differs from *S. streptodactylus*, *S. iphinoe*, and *S. modestus* by the short rather than long (general in this genus) crown of spines on the tip of third maxilliped. The present abundant specimens are generally similar to each other, and precisely agreed with the description of Banner & Banner (1975).

Distribution. South China Sea; Suez Canal; Red Sea; eastern Africa; Persian Gulf; Thailand; Japan; Philippines; Indonesia; Australia.

3.2.20 *Synalpheus neptunus* (Dana, 1852)

Alpheus neptunus Dana, 1852. *U. S. Explor. Exped.*, 13: 553, pl. 35. fig. 5.

Synalpheus neptunus Coutière, 1909. *Proc. U. S. natn. Mus.*, 36(1659): 87. fig. 53; Banner & Banner, 1972. *Crustaceana*, 23(1): 24 (Neotype established and full synonymy given).

Distribution. Hong Kong, Taiwan, South China Sea; Red Sea; Indian Ocean; Indonesia; Japan; Sulu Sea; Philippines; Australian.

Remarks. This species was reported by Banner & Banner (1978) and Liu (2008) from the South China Sea, but not found in the present specimens.

3.2.21 *Synalpheus nilandensis* Coutière, 1905 (Figs 35–36)

Synalpheus Nilandensis Coutière, 1905. *Fauna and Geog. Maid, and Laccad.*: 871, plate 70, figs 4–4d; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 327, fig. 14.

Synalpheus Nilandensis var. *oxyceros* Coutière, 1905. *Fauna and Geog. Maid, and Laccad.*: 871, plate 70, figs 5–5a.

Synalpheus Nilandensis var. *bandaensis* de Man, 1909. *Tijdschr. ned. dierk. Vereen*, 11(2): 121.

Material examined. (MBM 042230), 1♂, CL 4.9 mm, TL 11.2 mm, East China Sea, Sta. 4081, depth 74 m, 5 April 1959, coll. Guang-Yu Lin, Yu-Lin Liao; (MBM 081125), 1♀, 2♂, CL 5.5–6.5 mm, TL 19.3–22.3 mm, East China Sea, Sta. 4081, depth 81 m, 2 February 1959, coll. Jie-Shan Xu; (MBM 081145), 1♂, CL 7.2 mm, TL 19.1 mm, East China Sea, Sta. 4081, depth 79 m, 3 July 1959, coll. Li-Ren Cheng; (MBM 107826), 1♀, East China Sea, Sta. 4083, 8 December 1959; (MBM 042234), 1♀, East China Sea, Sta. 4081, depth 79 m, 3 July 1959; (MBM 042231), 1♂, East China Sea, Sta. 4081, depth 79 m, 25 October 1959, coll. Bao-Lin Zhang; (MBM 107821), 3♀, 4♂, East China Sea, Sta. V-3, depth 105 m, 27 August 1976, coll. Zhi-Chan Tang; (MBM 158690), 1♀, 2♂, Nansha Islands, South China Sea, Sta. 55 (16°27′57″N, 111°44′17″E), depth 46 m, 8 June 1990; (MBM 158622), 1♀, Nansha Islands, Sta. E13 (3°53.08.40N，112°16.22.80E), depth 50 m, 28 April 1986; 1♀, Nansha Islands, South China Sea, Sta. 55 (16°27′57″N, 111°44′17″E), depth 46 m, 8 June 1990.

Description. Carapace smooth, glabrous; acute tip of rostrum not reaching middle of first segment of antennular peduncle, strongly upturned; orbital much longer than rostrum, slightly upturned at tip; pterygostomial corner produced into acute angle; cardiac notch well developed.

Telson about 1.2 times as long as wide at base; dorsal surface with two pairs of spines, inserted approximately at 1/3 and 7/11 length of telson; posterior margin slightly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/2 length of mesial, posterolateral margins each produced into acute small tooth, distinctly shorter than lateral spines.

Eyes concealed in lateral and dorsal view.

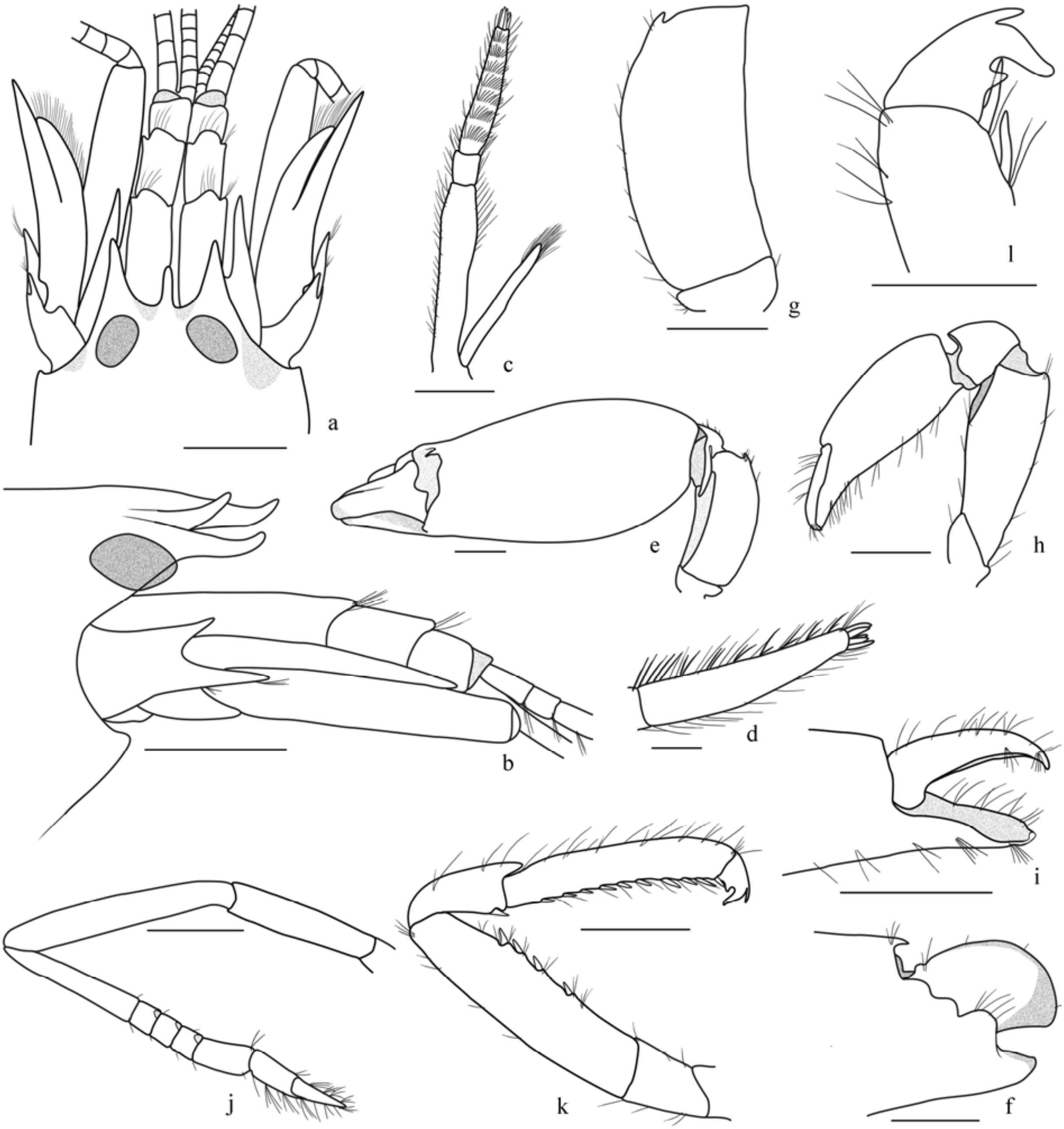

Fig. 35. *Synalpheus nilandens*is Coutière, 1905, male (cl 5.9 mm) (MBM 107821). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Ventral. d. Tip, dorsal. e–g. Major cheliped (left). e. Mesial. f. Chela, lateral. g. Merus, lateral. h–i. Minor cheliped (right). h. Lateral. i. Chela, mesial. j. Second pereiopod, lateral. k–l. Third pereiopod. k. Lateral. l. Distal propodus and dactylus, lateral. Scale bars: a–c, e–k = 1 mm; d, l = 0.5 mm.

Antennular peduncle slender, with distally acute stylocerite, overreaching end of first segment of antennular peduncle; second segment about 1.3 times as long as wide at base; visible part of first segment much longer than second and about 3 times as long as third. Basicerite with acute distodorsal tooth, distolateral tooth shorter than stylocerite, distolateral margin bearing setae; carpocerite overreaching end of third segment of antennular peduncle; scaphocerite blade moderately narrow, not reaching end of third segment of antennular peduncle, lateral spine developed, overreaching end of antennular peduncle, subequal to carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.5 times as long as wide at base; tip of ultimate segment bearing crown of five long spine-like

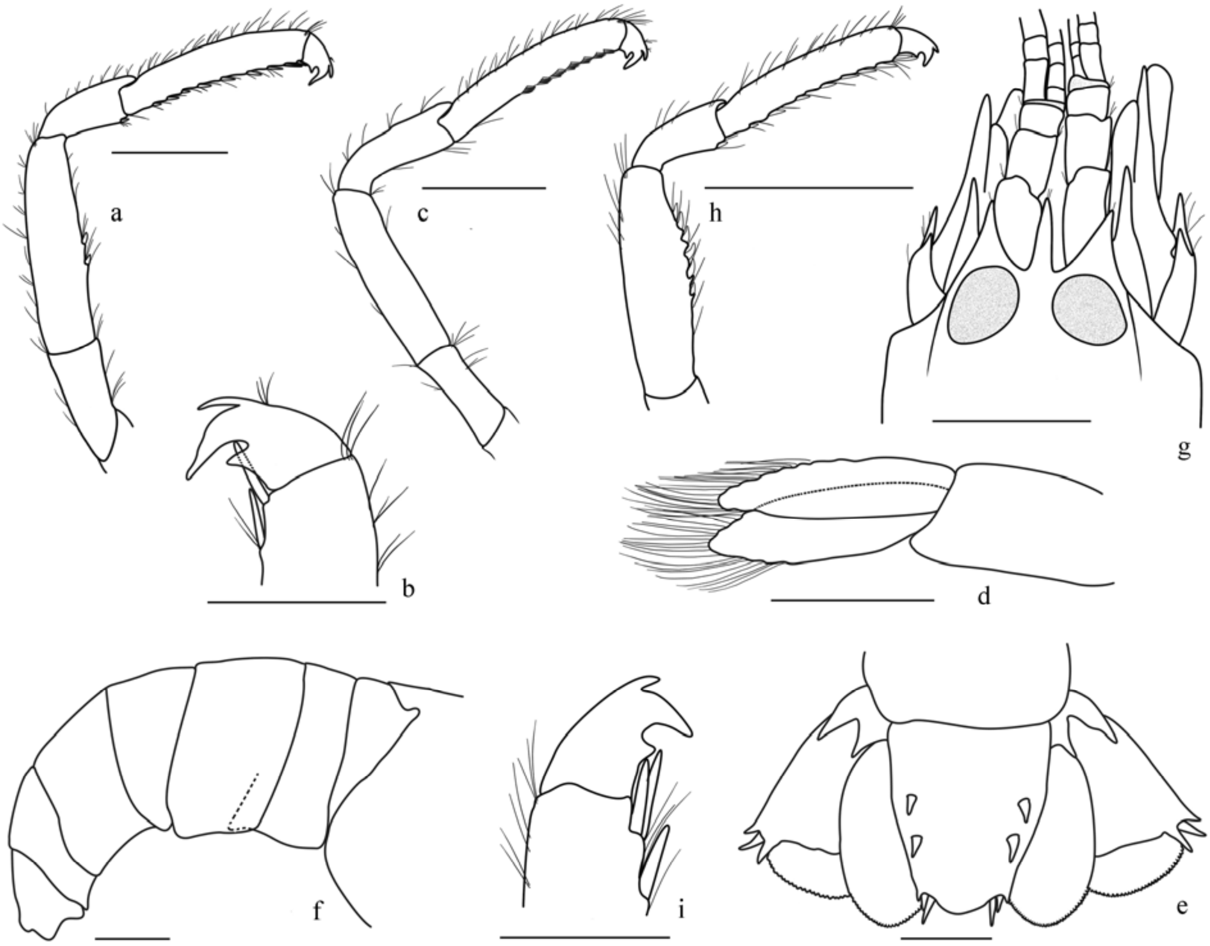

Fig. 36. *Synalpheus nilandens*is Coutière, 1905, male (cl 5.9 mm) (MBM 107821). a–b. Fourth pereiopod. a. Lateral. b. Distal propodus and dactylus, lateral. c. Fifth pereiopod, lateral. d. Second pleopod. e. Telson and uropod, dorsal. f. Abdomen, lateral, male (cl 6.1 mm) (MBM 158690). g. Frontal region, dorsal. h–i. Third pereiopod. h. Lateral. i. Distal propodus and dactylus, lateral. Scale bars: a, c–h = 1 mm; b, i = 0.5 mm.

setae, with transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus about 2.7 times as long as wide at base, superodistal margin with one small acute triangular tooth; carpus cup-shaped, with setae distodorsally; palm about 2.4 times as long as dactylus, distodorsal of palm with one acute projecting; dactylus distinctly longer than pollex.

Minor chela with merus about 3.5 times as long as wide at base, superodistal margin rounded; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.8 times as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 5.4 : 1 : 1 : 1 : 2.2, with first segment slightly longer than sum of last four segment; dorsal margin of palm convex; fingers slightly longer than palm. Third pereiopod moderately stout; merus longer than propodus, about 4.5 times as long as wide at base, ventral margin with 4 moderately large spines; carpus about 1/3 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with nine spines along ventral margin plus one distal pair of spines; dactylus curved to propodus, triunguiculate, middle tooth about 3 times as long as extensor tooth, extensor tooth about 1.5 times as long as flexor tooth, notch between extensor and middle tooth V-shaped, middle tooth distinctly much wider at base than extensor tooth, notch between middle tooth and flexor tooth U-shaped, middle tooth wider at base than flexor tooth. Fourth pereiopod generally similar to third; merus near as long as propodus, ventral margin with two spines; ventral margin of propodus bearing ten spines. Fifth pereiopod similar to third and fourth pereiopods, ventral margin of carpus without one distal spine; ventral margin of propodus with seven transversal rows of spine-like setae and two spines.

Remarks. This species was originally described by Coutière (1905b). It was complex, mainly because of the variation of the anterior region and the dactylus of the third pereiopod (Banner & Banner, 1975). The present specimens from East China Sea was similar to *S. nilandensis* forma *alpha*: the rostrum much shorter than the orbital hoods, the tips of both upturned; the dactylus of third pereiopod moderately stout and the middle tooth of it at right angles to the axis of the dactylus. The specimens from the South China Sea was most similar to the original description (Coutière, 1905b): the rostrum slightly longer than the orbital hoods, and upturned at the tip; the distolateral tooth of the basicerite shorter than the stylocerite; the dactylus of the third pereiopod about 1.5 times as long as wide at base, the extensor tooth slender and reduced, the middle tooth heavy and turning right angle to the axis of the dactylus, the flexor tooth shortest. The third form (the rostrum longer than the orbital hoods; the distolateral tooth of the basicerite longer than the stylocerite; the dactylus of the third pereiopod slender (*S. nilandensis* forma *bandaensis*)) was reported by Banner & Banner (1975) collected from near the Hong Kong, but not found in the present specimens.

Distribution. China seas; Red Sea; Maldives and Laccadives; Andaman Sea; Indonesia; Borneo; Hong Kong; Tuamotus Archipelago.

3.2.22 *Synalpheus odontophorus* de Man, 1909

Synalpheus odontophorus de Man, 1909. *Tijdschr. ned. dierk. Vereen*, 11(2): 113 (type locality: the type series came from 3 different stations in southern and eastern Indonesia; 90 to more than 120 meters); Banner & Banner, 1979: 244, fig. 4j–m.

Distribution. Hong Kong, South China Sea; Near Tanahdjampeah; Kai Island; near East cost of Timor; Japan.

Remarks. This species was reported by Banner & Banner (1978) and Liu (2008) from the South China Sea, but not found in the present specimens.

3.2.23 *Synalpheus paraneomeris* Coutière, 1905 (Figs 37–38)

Synalpheus paraneomeris Coutière, 1905. *Fauna and Geog. Maid, and Laccad.*, 2(4): 872, pl. 71, fig. 7; Banner, 1953. *Pacif. Sci.*, 7(1): 40, fig. 13–14; 1956. *Pacif. Sci.*, 10(3): 331, fig. 6; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 383, fig. 29.

Synalpheus paraneomeris halmaherensis de Man, 1909. *Tijdschr. ned. dierk. Vereen*, 11(2): 122.

Synalpheus paraneomeris praedabundus de Man, 1909. *Tijdschr. ned. dierk. Vereen*, 11(2): 123.

Synalpheus paraneomeris prolatus de Man, 1911. *Siboga Exped.*, 39(2): 241 (*cf.* Banner 1953: 43).

Synalpheus paraneomeris prasalini Coutière, 1921. *Trans. Finn. Soc. Fond. IF.*, 17(4): 415, pl. 61, fig. 6.

Synalpheus paraneomeris seychellensis Coutière, 1921. *Trans. Linn. Soc. Lond. II*, 17(4): 415, pl. 61, fig. 7.

Synalpheus townsendi Coutière, 1909. *Proc. U. S. nat. Mus.*, 36 (1659): 32 (*partim cf.* Banner, 1953: 44).

Material examined. CL 3.2–5.7 mm, TL 6.9–14.3 mm. (MBM 158980), 22 ovigerous ♀, 37♂, Chenhang Island N-side, Xisha Islands, 18 May 1981, coll. Zhao-Hong Meng, Hui-Lian Chen; (MBM 270026), 1♂, Panshi Yu, Xisha Islands, 15 April 1975; (MBM 157973), 1♂, Jinqing Island, Xisha Islands, 25 April 1958, coll. Zhen-Gang Fan, Jie-Shan Xu; (MBM 107762), 2 ovigerous ♀, Shi Island, Xisha Islands, 10 May 1980, coll. Xiu-Bin Fang; (MBM 158852), 1 ovigerous ♀, Nansha Islands, 14 May 1990; (MBM 107748), 2♂, depth 1–3 m, 26 March 1992; (MBM 107750), 1 ovigerous ♀, Dong Island, Xisha Islands, 28–31 May 1980; (MBM 107746), 10 ovigerous ♀, 10♂, , Yongxing Island, Xisha Islands, 11–13 June 1980, coll. Xiu-Bin Fang; (MBM 157909), 1♂; (MBM 158233), 1 ovigerous ♀, Dazhou Island, 12 June 1957; (MBM 107753), 1♂, Dong Island, Xisha Islands, 28–31 May 1980, coll. Xiu-Bin Fang; (MBM 107759), 1 ovigerous ♀, Jinyin Island, Xisha Islands,, 15 May 1980, coll. Xiu-Bin Fang; (MBM 158296), 1♂, Dong Island, Xisha Islands, 9 June 1975, coll. Xian-Qiu Ren; (MBM 107757), 1 ovigerous ♀, Yongxing Island, Xisha Islands, 11–13 June 1980, coll. Xiu-Bin Fang. (MBM 233239), 2♂, Yongxing Island, Xisha Islands, Sta. 3, 26 May 1975; (MBM 157802), 1 ovigerous ♀, Dong Island, Xisha Islands, 28–31 May 1980; (MBM 233267), 3 ovigerous ♀, 3♂, Dong Island, Xisha Islands, Sta. 5–9, 9 June 1975; (MBM 158204), 1♂, Sanya, Dadonghai, 1 March 1997, coll. Xin-Zheng Li. (MBM 157802), 1 ovigerous ♀; (MBM157995), 1♂, Xisha Islands, June 1958, coll. Shu-Lian Zheng; (MBM 157827), 6 ovigerous ♀, 3♂; (MBM 158499), 2♂; (MBM 158308),1 ovigerous ♀, Shi Island, Xisha Islands, 8 May 1975; (MBM 107749), 1 ovigerous ♀, Chenhang Island, Xisha Islands, 18 May 1980, coll. Xiu-Bin Fang; 2 ovigerous ♀, Subi Reef, Nansha Islands, depth 2 m, 11 May 2004, coll. Yong-Qiang Wang; 1 ovigerous ♀, Subi Reef, Nansha Islands, depth 1.3 m, 4 May 2004, coll. Yong-Qiang Wang; 1 ovigerous ♀, 1♂, Subi Reef, Nansha Islands, depth 3 m, 6 May 2004, coll. Yong-Qiang Wang; 2 ovigerous ♀, 3♂, Subi Reef, Nansha Islands, depth 3 m, 10 May 2004, coll. Yong-Qiang Wang; 2 ovigerous ♀, 2♂, Subi Reef, Nansha

Islands, depth 1.5 m, 1 May 2004, coll. Yong-Qiang Wang; (MBM 107747), 1♂, Yongxing Island, Xisha Islands, 11 June 1980, coll. Xiu-Bin Fang.

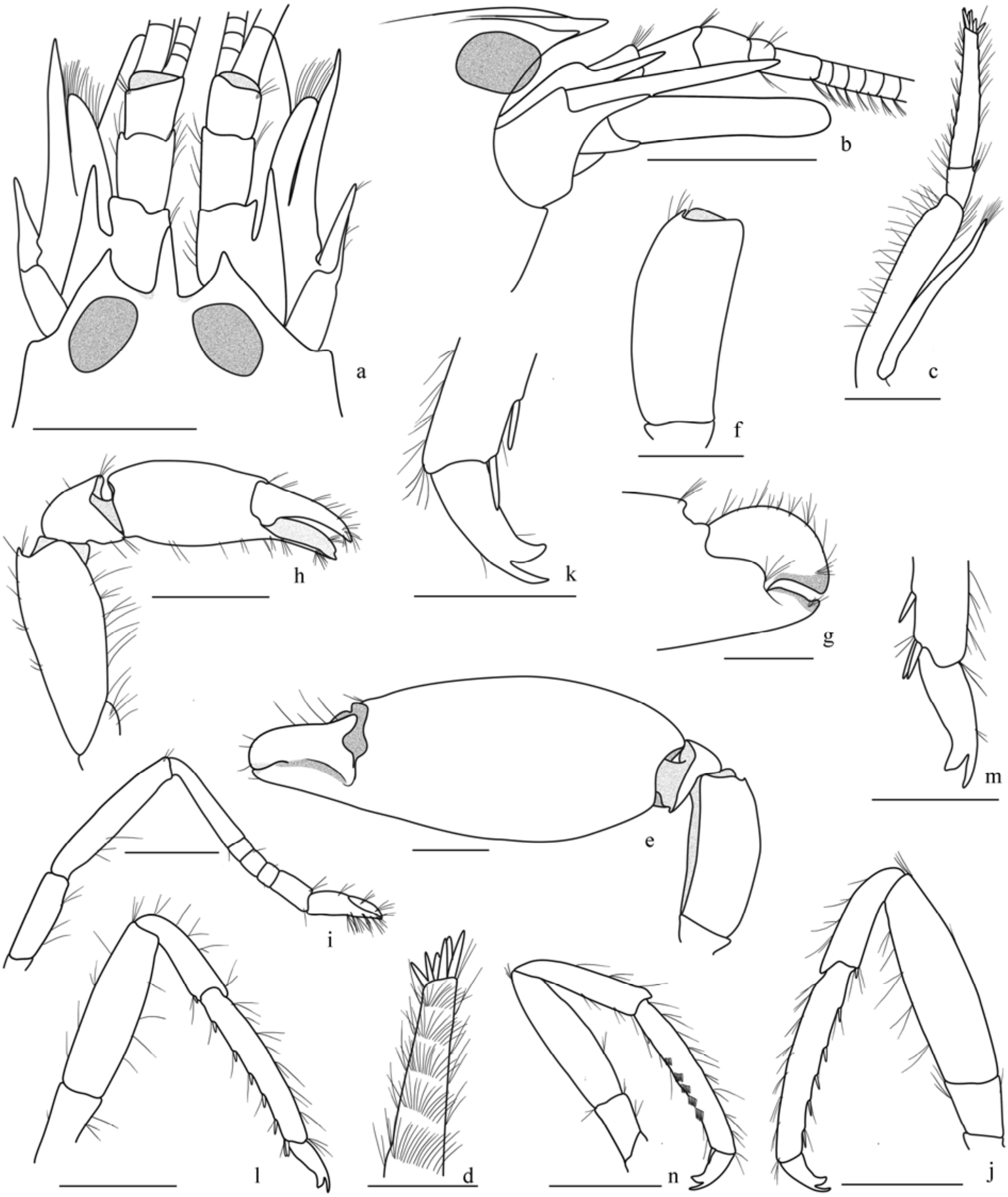

Fig. 37. *Synalpheus paraneomeris* Coutière, 1905, female (cl 4.1 mm) (MBM 107746). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Dorsal. d. Tip, ventral. e–g. Major cheliped (left). e. Mesial. f. Merus, lateral. g. Chela, lateral. h. Minor cheliped (right), lateral. i. Second pereiopod, lateral. j–k. Third pereiopod. j. Lateral. k. Distal propodus and dactylus, lateral. l–m. Fourth pereiopod. l. Lateral. m. Distal propodus and dactylus, lateral. n. Fifth pereiopod, lateral. Scale bars: a–c, e–j, l, n = 1 mm; d, k, m = 0.5 mm.

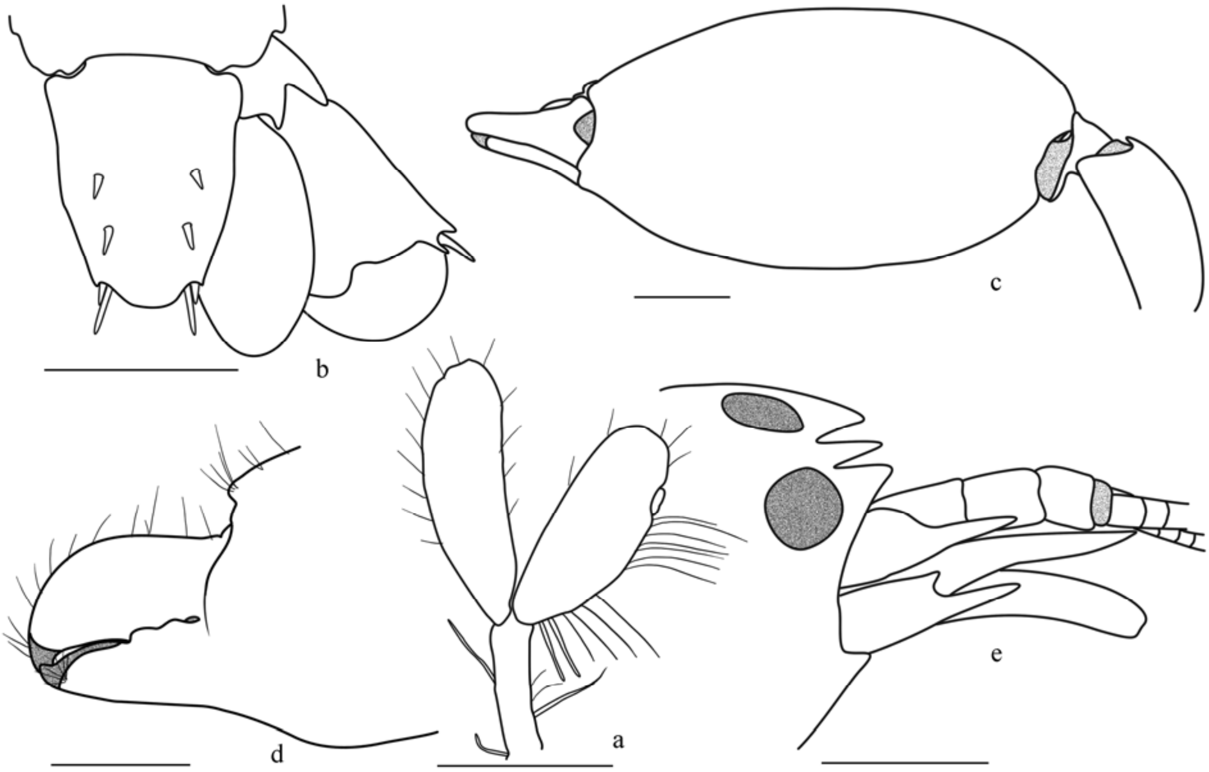

Fig. 38. *Synalpheus paraneomeris* Coutière, 1905, female (cl 4.1 mm) (MBM 107746). a. Second pleopod. b. Telson and uropod, dorsal. female (cl 3.6 mm) (MBM 107746). c–d. Major cheliped (left). c. Mesial. d. Chela, lateral. female (cl 4.5 mm) (MBM 107746). e. Frontal region, lateral. Scale bars = 1 mm.

Description. Carapace smooth, glabrous; rostrum about 2.3 times as long as wide at base, acute tip not reaching end of first segment of antennular peduncle; orbital hoods shorter than rostrum, wider at base than long; pterygostomial corner produced into acute angle; cardiac notch well developed.

Telson about 1.3 times as long as wide at base; dorsal surface with two pairs of spines, inserted approximately at 1/2 and 2/3 length of telson; posterior margin strongly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/3 length of mesial, posterolateral margins each produced into small acute tooth, distinctly shorter than contiguous short spines.

Eyes concealed in dorsal view, exposed in lateral view.

Antennular peduncle moderately slender, with distally acute stylocerite, latter reaching middle of second segment of antennular peduncle; second segment about 1.5 times as long as wide at base; visible part of first segment longer than second and less twice as long as third. Basicerite without distodorsal tooth, distolateral tooth near as long as stylocerite, overreaching end of first segment of antennular peduncle; carpocerite far overreaching end of third segment of antennular peduncle; scaphocerite blade moderately narrow, hardly reaching end of third segment of antennular peduncle, lateral spine developed, overreaching end of antennular peduncle, much shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.5 times as long as wide at base; tip of ultimate segment bearing crown of five long spine-like setae, with transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus about 3.5 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, with setae distodorsally; palm about 2.5 times as long as dactylus, distodorsal of palm slightly projecting; dactylus as long as pollex, distally slightly curved.

Minor chela with merus about 3.6 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.3 times as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 7 : 1.2 : 1.5 : 1.2 : 2.6, with first segment longer than sum of last four segment; dorsal margin of palm convex; fingers near as long as palm. Third pereiopod moderately stout; merus slightly longer than propodus, about 3.5 times as long as wide at base; carpus about 1/2 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with 4–5 spines along ventral margin plus one distal pair of spines near dactylus; dactylus about 1/4 length of propodus, slightly curved to propodus, biunguiculate, extensor tooth slightly longer than flexor tooth, notch between extensor and flexor tooth V-shaped, flexor tooth much wider at base than extensor tooth. Fourth pereiopod generally similar to third; merus near as long as propodus; ventral margin of propodus with 4–5 spines plus one distal pair of spines. Fifth pereiopod similar to third and fourth pereiopod, ventral margin of carpus without distal one spine; ventral margin of propodus with five transversal rows of spine-like setae and one spines.

Remarks. This species was originally described by Coutière (1905). The present specimens show similar variability as the Australian specimens. However, one specimens has a much inflated major chela (Fig. 38c–d), which was not reported before. Miya (1972) described this species from Japan. His description was different from the present description in four ways: the rostrum more slender and reaching the middle of the second segment of the antennular peduncle rather than the end of the first segment; distal superior margin of the palm in the major chela with one tooth; the ventral margin of the propodus in third pereiopods with 7–8 spines rather than 4–5 spines; two pairs of spines of the telson more larger.

Distribution. South China Sea; Maldive Archipelago; Indonesia; Japan (variety?); Philippines; Mariana; Caroline; Marshall; Gilbert; Fiji; Samoa; Line and Hawaiian Islands; Australian.

3.2.24 *Synalpheus pescadorensis* Coutière, 1905

Synalpheus pescadorensis Coutière, 1905. *Fauna and Geog. Maid, and Laccad.*, 2(4): 877, pl. 73, fig. 15; de Man, 1926. *Mitt. Zool Mus. Berl.*, 12(2): 341; 1911. *Siboga Exped.*, 39(2): 298, fig. 63; Tiwari, 1963. *Ann. Fac. Sci. Saigon*: 279, fig. 5; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 301, fig. 6.

Distribution. Taiwan, South China Sea; Maldive Archipelago; Vietnam; Indonesia; Sulu Archipelago; Pescadores; Solomon Islands; Australian; Philippines.

Remarks. This species was reported by Banner & Banner (1978) and Liu (2008) from the South China Sea, but not found in the present specimens.

3.2.25 *Synalpheus pococki* Coutière, 1898

Synalpheus neomeris var. *pococki* Coutière, 1898. *Bull. Soc. Ent. France*, 1898(7): 167, fig. 2 (Holothuria Bank, N. W. Australia, Macclesfield Bank. Arafura Sea).

Synalpheus pococki de Man, 1911. *Siboga Exped.*, 39(2): 234, fig. 32; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 366, fig. 24a–h.

Distribution. Taiwan, South China Sea; Aru Islands; Australian.

Remarks. This species was reported by Liu (2008) from the South China Sea, but not found in the present specimens.

3.2.26 *Synalpheus stimpsonii* (de Man, 1888) (Figs 39–40)

Alpheus stimpsonii de Man, 1888. *Arch Naturgesch.*, 53(1): 513, pl. 22, fig. 3.

Synalpheus stimpsoni Banner & Banner, 1966. *Siam Soe. Mono.*, 3: 46, fig. 12; 1968. *Mieronesica*, 4(2): 274; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 286, fig. 2.

Alpheus amhoinae Zehntner, 1894. *Rev. Suisse Zool.*, 2: 202, pl. 8, fig. 23.

Synalpheus amhoinae de Man, 1911. *Siboga Exped.*, 39 (2): 203, fig. 20; 1922. *Siboga Exped.*, 39(5): 26, fig. 13; Banner, 1958. *Pacif. Sci.*, 12(2): 159, fig. 2.

Synalpheus consobrinus de Man. 1911. *Siboga Exped.*, 39(2): 204, fig. 21.

Synalpheus brucei Potts, 1915. *Pap. Dep. Mar. Biol. Carnegie Instn. Wash.*, 8: 76, pl. I, fig. 2, textfigs 1 a–b, 2a–c, 3; Clark, 1921. *Bull. U. S. natn. Mus.*, 82, 1(2): 625.

Alpheus stimpsoni de Man var? Schenkel, 1902. *Verh. naturf. Ges. Basel.*, 13: 567, pl. 13, fig. 22.

Synalpheus striatus Kubo, 1938. *Annotnes. Zool. Jap.*, 17(1): 89, figs 1, 2; Miya, 1972. *Publ. Amakusa Mar. Biol. Lab. Kyushu*, 3(1): 47, pl. 6.

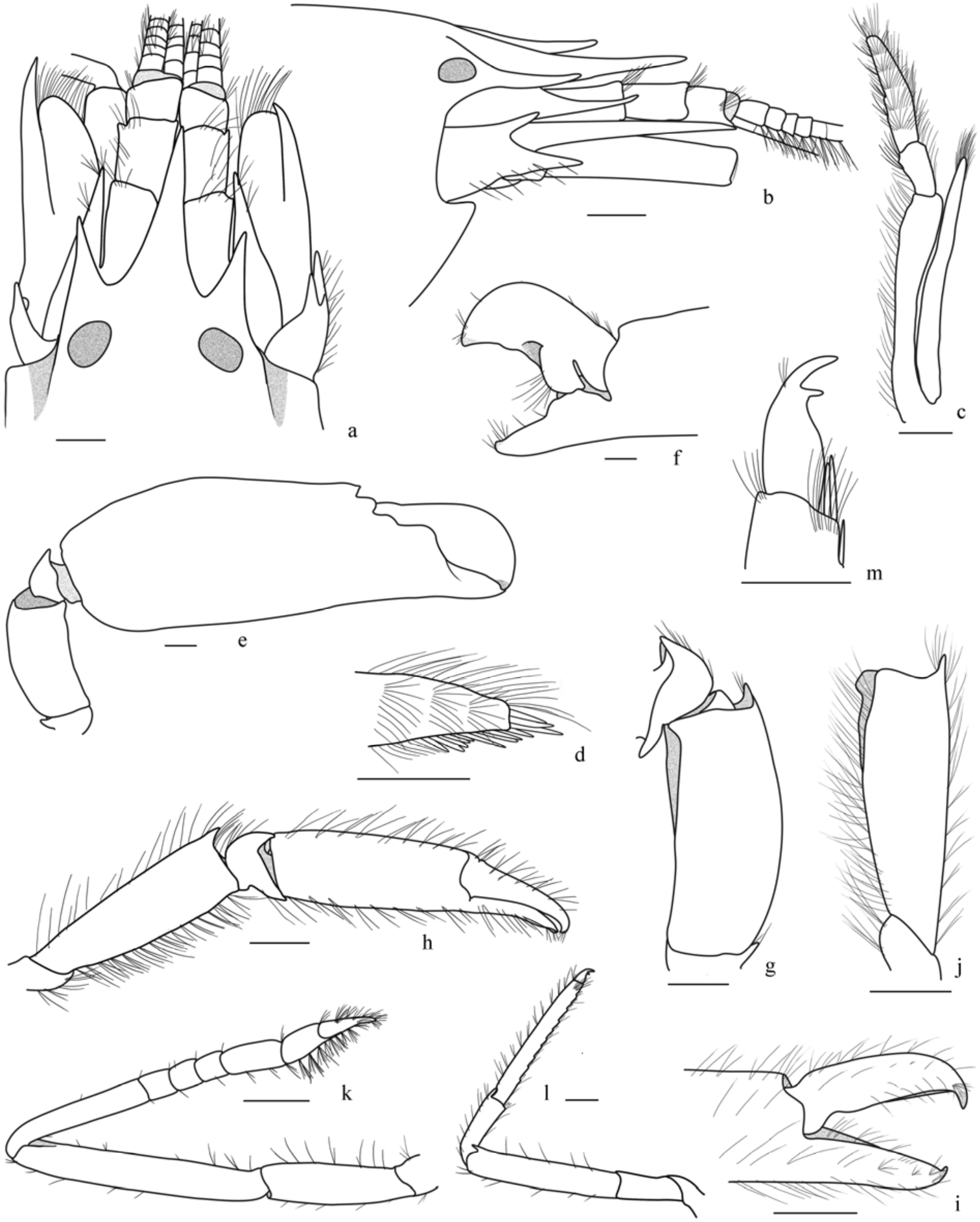

Fig. 39. *Synalpheus stimpsonii* (de Man, 1888), male (cl 8.2 mm) (MBM 157903). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Ventral. d. Tip, dorsal. e–g. Major cheliped (left). e. Mesial. f. Chela, lateral. g. Merus, lateral. h–j. Minor cheliped (right). h. Lateral. i. Chela, lateral. j. Merus, lateral. k. Second pereiopod, lateral. l–m. Third pereiopod. l. Lateral. m. Distal propodus and dactylus, lateral. Scale bars: a–c, e–l = 1 mm; d, m = 0.5 mm.

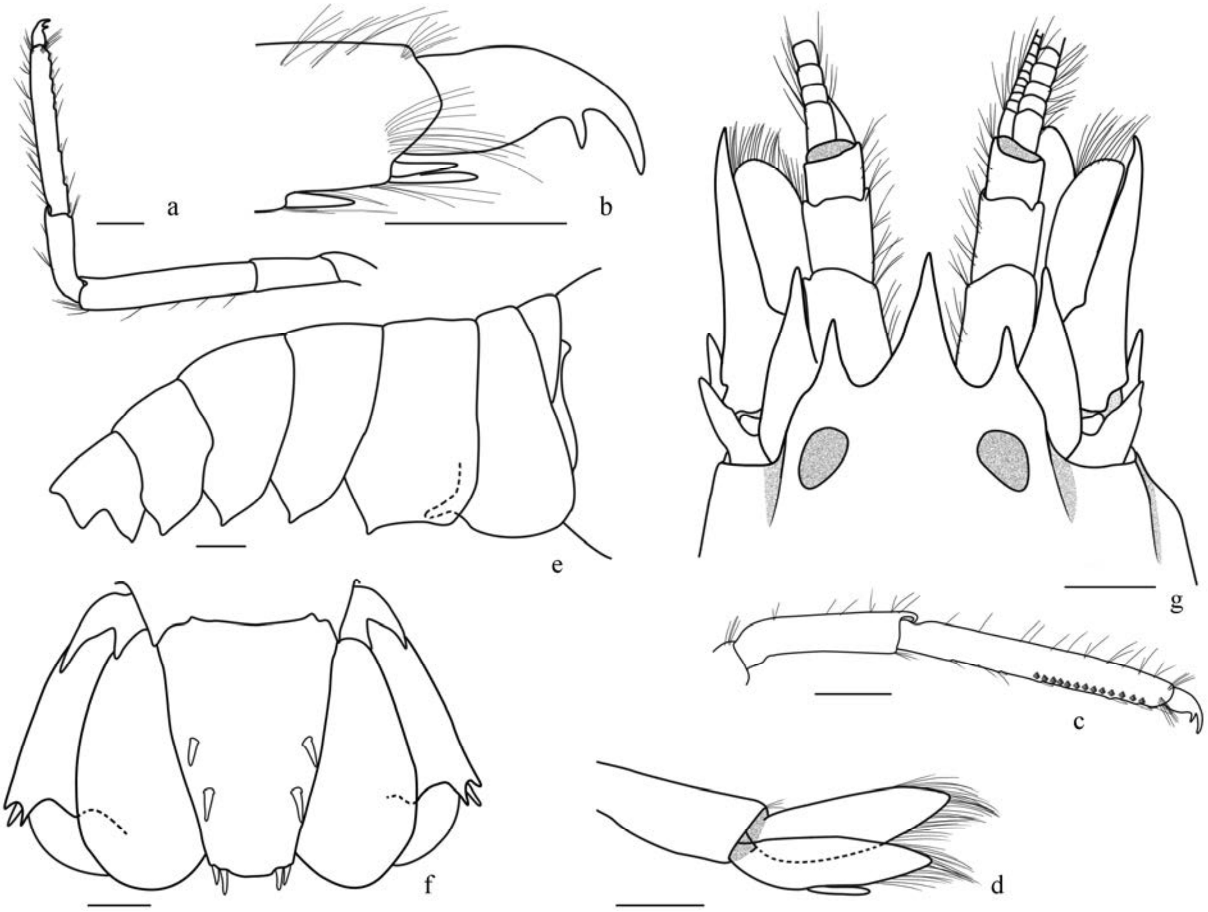

Fig. 40. *Synalpheus stimpsonii* (de Man, 1888), male (cl 8.2 mm) (MBM 157903). a–b. Fourth pereiopod. a. Lateral. b. Distal propodus and dactylus, lateral. c. Fifth pereiopod, propodus and dactylus, lateral. d. Second pleopod. e. Abdomen, lateral. f. Telson and uropod, dorsal. g. Female (cl 7.9 mm) frontal region, dorsal. Scale bars: b = 0.5 mm; a, c–g = 1 mm.

Material examined. (MBM 157748), 1♀, 1♂, CL 7.3–10.5 mm, TL 17.2–22.3 mm; (MBM 158719), 1♀, CL 7.9 mm, TL 12.5 mm; (MBM 157903), 1♂, CL 8.2 mm, 19 April 1975, coll. Xian-Qiu Ren; (MBM 158503), 1♀, 1♂, CL 11.5–12.1 mm, TL 25.9–28.8 mm; (MBM 158592), 1♂, CL 8.2 mm, 19 April 1958.

Description. Carapace smooth, glabrous; rostrum slightly depressed, slightly concave in lateral view, acute tip reaching end of second segment of antennular peduncle, with rounded carina, extending to level of eyes; orbital hoods near half-length of rostrum; pterygostomial corner produced into blunt acute angle; cardiac notch well developed.

Telson about 1.3 times as long as wide at base; dorsal surface with two pairs of moderately large spines, inserted approximately at 1/2 and 2/3 length of telson; posterior margin slightly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 2/3 length of mesial, posterolateral margins not produced.

Eyes concealed in lateral and dorsal view.

Antennular peduncle moderately stout, with distally acute stylocerite, latter reaching about 1/3 length of second segment of antennular peduncle; second segment about 1.3 times as long as wide; visible part of first segment longer than second and about twice as long as third. Basicerite with acute distodorsal tooth, distolateral tooth reaching about 1/2 length of visible part of first segment of antennular, distinctly shorter than stylocerite; carpocerite slightly overreaching end of third segment of antennular peduncle; scaphocerite blade moderately broad, reaching middle of third segment of antennular peduncle, lateral spine developed, distally curved inward, reaching end of antennular peduncle, shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.5 times as long as wide at base; tip of ultimate segment bearing crown of four spine-like setae, with transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus about 3.5 times as long as wide at base, superodistal margin with acute triangular tooth; carpus cup-shaped, with setae distodorsally; chela slightly compressed, with palm about 2.2 times as long as dactylus, distodorsal of palm with one obtuse projecting; dactylus as long as than pollex, distally slightly curved..

Minor chela with merus about 5.2 times as long as wide at base, superodistal margin with acute triangular tooth, ventral and dorsal margin bearing fine long setae; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.6 times as long as fingers, dorsal and ventral margin with fine setae; dactylus and pollex tapering, distal single tooth, margin with fine setae.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 5.5 : 1 : 1 : 1 : 2.1, with first segment slightly longer than sum of last four segment; dorsal margin of palm convex; fingers near as long as palm. Third pereiopod slender; merus slightly longer than propodus, about 6.6 times as long as wide at base; carpus about 1/3 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with two distal spines; propodus with ten small spines along ventral margin plus one distal pair of spines near dactylus; dactylus slightly curved to propodus, biunguiculate, extensor tooth about twice as long as flexor tooth, notch between extensor and flexor tooth V-shaped. Fourth pereiopod generally similar to third; ventral margin of propodus with six small spines. Fifth pereiopod similar to third and fourth pereiopods, propodus with distally 13 transversal rows of spine-like setae and three spines on ventral margin.

Remarks. This species was original described by de Man (1888). It is so variable in some characters (Banner & Banner, 1966) that some varieties (*S. amboiae* de Man, 1911, *S. consobrinus* de Man, 1911, *Alpheus stimpsoni* de Man var?, *S. striatus* Kubo, 1938) were described as new forms at first, and then synonymized with *S. stimpsonii* (de Man, 1888) (Banner & Banner, 1966, 1968, 1975). The variable characters mainly are: the length of the rostrum; the length of the orbital hoods compared to the rostrum; the length of first segment of the antennular peduncle compared to the sum of two following segments; the relative length of the distodorsal and distolateral tooth; the proportions of the pereiopods; the dorsal spines and posterolateral margins of telson (Banner & Banner, 1975). Those characters were taken variable in *Synalpheus*.

The present seven specimens are also varied in the length of the rostrum. Other than the length or relative length of characters mentioned above, the specimens also differ from Kubo (1938: 84–85, pl. 6, fig. D) and Banner & Banner (1966: 79, fig. 12B) by the small and obtuse tooth on the superodistal margin of the palm of major chela.

Distribution. South China Sea; Eastern Africa and Madagascar to Singapore; Thailand; Japan; Philippines; Indonesia; Australia; Marshall; Gilbert; Loyalty Islands.

3.2.27 *Synalpheus streptodactylus* Coutière, 1905 (Figs 41–43)

Synalpheus neomeris streptodactylus Coutière, 1905. *Fauna and Geog. Maid, and Laccad.*, 2(4): 870, fig. 1.

Alpheus neomeris de Man, 1897. *Zool. Jb. Syst.*, 9: 734 (*partim*); Coutière, 1905, *Op. Cit.*: 869, fig. 1.

Synalpheus streptodactylus de Man, 1911. *Siboga Exped.*, 39(2): 226, pl. 7, fig. 29; Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 362, fig. 23.

Synalpheus metaneomeris streptodactylus Coutière, 1921. *Trans. Linn. Soe. Lond. II*, 17(4): 414, pl. 60, fig. 4.

Synalpheus streptodactylus streptodactylus Banner & Banner, 1966. *Pacif. Sci.*, 20(2): 157; 1966. *Siam Soc. Mono.*, 3, p. 50, fig. 14; Miya, 1972. *Publ. Amakusa Mar. Biol. Lab.*, 3(1): 69, pl. 14.

Synalpheus streptodactylus hadrungus Banner & Banner, 1966. *Pacif. Sci.*, 20(2): 158.

Synalpheus jedanensis Barnard, 1950. *Ann. S. Afr. Mus.*, 38: 738, fig. 139c—i (nec de Man); Fourmanoir, 1958. *Naturaliste malgache*, 10(1–2): 115, fig. 3 (nec de Man).

Material examined. CL 3.2–5.7 mm, TL 6.5–12.4 mm. (MBM 270607), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6216, depth 67 m, 10 April 1962, coll. Fu-Zeng Sun; (MBM 270607), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6216, depth 67 m, 10 April 1962, coll. Fu-Zeng Sun; (MBM 270216), 1 ovigerous ♀, Tonkin Gulf (Beibu Gulf), Sta. 6216, depth 57 m, 13 March 1960, coll. Fu-Zeng Sun; (MBM 270223), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6252, depth 56.2 m, 7 July 1960, coll. Shou-Peng Shen; (MBM 270222), 1 non-ovigerous, Tonkin Gulf (Beibu Gulf), Sta. 6251, depth 47 m, 7 February 1960, coll. Zhen-Gang Fan; (MBM 270221), 1 non-ovigerous, Tonkin Gulf (Beibu Gulf), Sta. 6262, depth 49.6 m, 7 July 1960, coll. Zhen-Gang Fan; (MBM 270219), 2♂, Tonkin Gulf (Beibu Gulf), Sta. 6273, depth 46 m, 25 October 1960, coll. Shou-Peng Shen; (MBM 270220), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6222, depth 24 m, 13 February 1960, coll. Zhen-Gang Fan, Si-Ming Lv; (MBM 270217), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6249, depth 30.5 m, 13 July 1960, coll. Fu-Zeng Sun; (MBM 270227), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7405, depth 65 m, 12 October 1962; (MBM 107815), 1♂, East China Sea, Sta. III-4, depth 82 m, 27 June 1976, coll. Shou-Peng Shen; (MBM 107813), 2 non-ovigerous, Tonkin Gulf (Beibu Gulf), Sta. 7405, depth 42 m, 12 January 1962, coll. Shou-Peng Shen; (MBM 270197), 1 ovigerous ♀, East China Sea, Sta. III-4, depth 82 m, 27 June 1976, coll. Shou-Peng Shen; (MBM 081123), 1 ovigerous ♀, East China Sea,

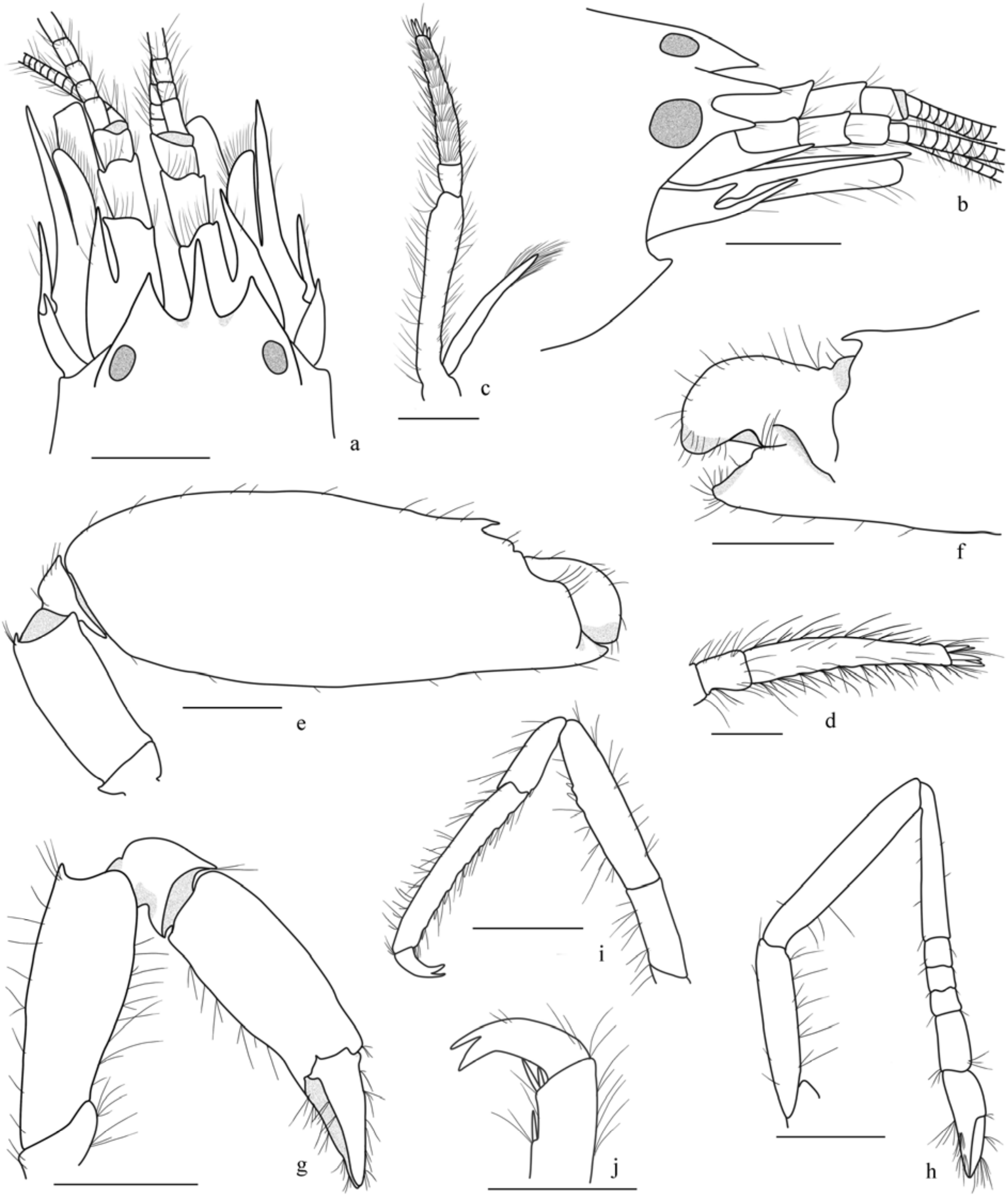

Fig. 41. *Synalpheus streptodactylus* Coutière, 1905, female (cl 5.1 mm) (MBM 270223). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Ventral. d. Tip, dorsal. e–f. Major cheliped (left). e. Lateral. f. Chela, lateral. g. Minor cheliped (right), lateral. h. Second pereiopod, lateral. i. Third pereiopod, lateral. j. Distal propodus and dactylus, lateral. Scale bars: a–i = 1 mm; j = 0.5 mm.

Sta. 4083, depth 89 m, 24 October 1959, coll. Riu-Yu Liu; (MBM 270415), 1 non-ovigerous, Tonkin Gulf (Beibu Gulf), Sta. 7404, depth 49.6 m, 13 October 1962; (MBM 270226), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6262, depth 51.5 m, 8 February 1960, coll. Zhen-Gang Fan; (MBM 270201), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6167, depth 48 m, 8 February 1960, coll. Fu-Zeng Sun; (MBM 270218), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6243, depth 93 m, 11 December 1959, coll. Xiu-Tong Ma; (MBM 270472), 1 ovigerous ♀, 2 non-ovigerous, Tonkin Gulf (Beibu Gulf), Sta. 6182, depth 18 m, 11 February 1960, coll. Fu-Zeng Sun; (MBM 270453), 9 ovigerous ♀, Tonkin Gulf (Beibu Gulf), Sta. 6276, depth 29 m, 6 November 1960, coll. Bao-Lin Zhang; (MBM 270363), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7302, depth 30 m, 10 April 1962, coll. Fu-Zeng Sun; (MBM 270452), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6265, depth 60 m, 1 December 1959, coll. Xiu-Tong Ma; (MBM 270637), 1 ovigerous ♀, 1♂, depth 53 m, 22 August 1962; 1♂, East China Sea, Sta. 4083, depth 88 m, 4 July 1959, coll. Li-Ren Cheng; (MBM 081146), 2 non-ovigerous, East China Sea, Sta. 4084, depth 100 m, 1 February 1959, coll. Jie-Shan Xu; (MBM 270424), 1 non-ovigerous, Tonkin Gulf (Beibu Gulf), Sta. 6240, depth 58 m, 9 December 1960, coll. Zhen-Gang Fan; (MBM 270525), 1 ovigerous ♀, Tonkin Gulf (Beibu Gulf), Sta. 7503, depth 52 m, 22 August 1962, coll. Fu-Zeng Sun; (MBM 270134), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7702, depth 55 m, 12 January 1962, coll. Fu-Zeng Sun; (MBM 107809), 1 ovigerous ♀, 1♂, Nanji island, depth 15 m, 24 October 1979, coll. Xian-Qiu Ren; (MBM 107805), 2 ovigerous ♀, 2♂, East China Sea, Sta. V-7, depth 100 m, 10 October 1975, coll. Zhi-Chan Tang, Bao-Lin Zhang; (MBM 107817), 1 non-ovigerous, East China Sea, Sta. V-2, depth 85 m, 4 July 1976, coll. Zhi-Chan Tang, Feng-Shan Xu; (MBM 107818), 2 non-ovigerous, East China Sea, Sta. V-7, depth 131 m, 5 July 1976, coll. Zhi-Chan Tang, Rui-Yu Liu; (MBM 107804), 1 non-ovigerous, East China Sea, Sta. V-6, depth 115 m, 4 July 1976, coll. Rui-Yu Liu; (MBM 107816), 1 ovigerous ♀, 2♂, East China Sea, Sta. V-10, depth 110 m, 10 October 1975, coll. Zhi-Chan Tang, Jie-Shan Xu; (MBM 107808), 1 ovigerous ♀, 1♂, East China Sea, Sta. V-4, depth 99 m, 5 July 1976, coll. Zhi-Chan Tang, Yao-Quan Wu; (MBM 270594), 1 ovigerous ♀, 1♂, East China Sea, Sta. 6277, depth 31 m, 17 May 1960, coll. Zhen-Gang Fan; (MBM 107810), 2 ovigerous ♀, 1♂, East China Sea, Sta. V-2, depth 99 m, 5 July 1976, coll. Zhi-Chan Tang; (MBM 107814), 16 ovigerous ♀, 12♂, East China Sea, Sta. V-3, depth 105 m, 27 August 1976, coll. Zhi-Chan Tang; (MBM 270591), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6277, depth 35 m, 9 March 1960, coll. Zhen-Gang Fan; (MBM 107807), 2♂, East China Sea, Sta. V-5, depth 90 m, 11 October 1975, coll. Zhi-Chan Tang; (MBM 107806), 2 ovigerous ♀, 7♂, East China Sea, Sta. V-5, depth 100 m, 10 October 1975, coll. Zhi-Chan Tang, Feng-Shan Xu; (MBM 107820), 1 ovigerous ♀, 1♂, East China Sea, Sta. V-6, depth 112 m, 5 July 1976, coll. Zhi-Chan Tang, Feng-Shan Xu; (MBM 107812), 1 ovigerous ♀, East China Sea, Sta. V-7, depth 126 m, 21 September 1976, coll. Zhi-Chan Tang, Feng-Shan Xu; (MBM 107811), 2 ovigerous ♀, East China Sea, Sta. V-3, depth 105 m, 11 June 1978, coll. Bao-Lin Zhang. 1 ovigerous ♀, (MBM 270588), Tonkin Gulf (Beibu Gulf), Sta. 6265, depth 62 m, 25 May 1960, coll. Fu-Zeng Sun; (MBM 270609), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 7901, depth 52 m, 17 August 1962, coll. Fu-Zeng Sun; (MBM 107740), 1 ovigerous ♀, 2♂, Nanhai, Xincun, depth 1–3 m, 26 March 1992, coll. Rui-Yu Liu; 1♂, Yezhu Island, 11 April 1992; (MBM 042231), 1♂, East China Sea, Sta. 4081, depth 79 m, 25 October 1959, coll. Bao-Lin Zhang; (MBM 158542), 1♂, Yezhu Island, depth 97 m, from living millipede, 25 March 1992; (MBM 159262), 1♂, Sanya, Dadonghai, E-side, depth 4–6 m, 1 December 1997; (MBM 158375), 1♂, East China Sea, Sta. V-8, depth 79 m, 10 October 1975, coll. Zhi-Chan Tang; (MBM 158076), 1♂, Sanya, Dadonghai, E-side, depth 6–9 m, 27 November 1997, coll. Xin-Zheng Li; (MBM 158209), 1♂, Sanya, Dadonghai, 1 March 1997, coll. Xin-Zheng Li; (MBM 158652), 1♂, Yalong Bay, coll. Rui-Yu Liu; (MBM 270720), 1 ovigerous ♀, Xinying, 14 January 1956; (MBM 158334), 1♂; (MBM 159319), 3 ovigerous ♀, 2♂, Nanhai, Xincun, depth 1–3 m, 26 March 1992; (MBM 159319), 1 ovigerous ♀, 2♂, Nanhai, Xincun, depth 1–3 m, 21 March 1992; (MBM 159279), 1 ovigerous ♀, 1♂, Yezhu Island, 27 March 1992; (MBM 159278), 1♂; (MBM 158223), 1 ovigerous ♀, 4♂, Tiaozhou Island, 26 December 1954, coll. Rui-Yu Liu; (MBM 107777), 1♂, Shalao, depth 12 m, 4 April 1992; (MBM 107766), 1 ovigerous ♀, Yezhu Island, 17, November 1990. (MBM159299), 1♂.

Description. Carapace smooth, glabrous; rostrum about 2.7 times as long as wide at base, acute tip not reaching end of first segment of antennular peduncle; orbital hoods about 5/8 length of rostrum; pterygostomial corner produced into acute angle; cardiac notch well developed.

Telson about 1.4 times as long as wide at base; dorsal surface with two pairs of moderately large spines, inserted approximately at 2/5 and 3/5 length of telson; posterior margin strongly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/3 length of mesial, posterolateral margins each produced into acute small tooth, but distinctly shorter than lateral spines.

Eyes concealed in lateral and dorsal view.

Antennular peduncle moderately slender, with distally acute stylocerite, latter reaching about 1/4 length of second

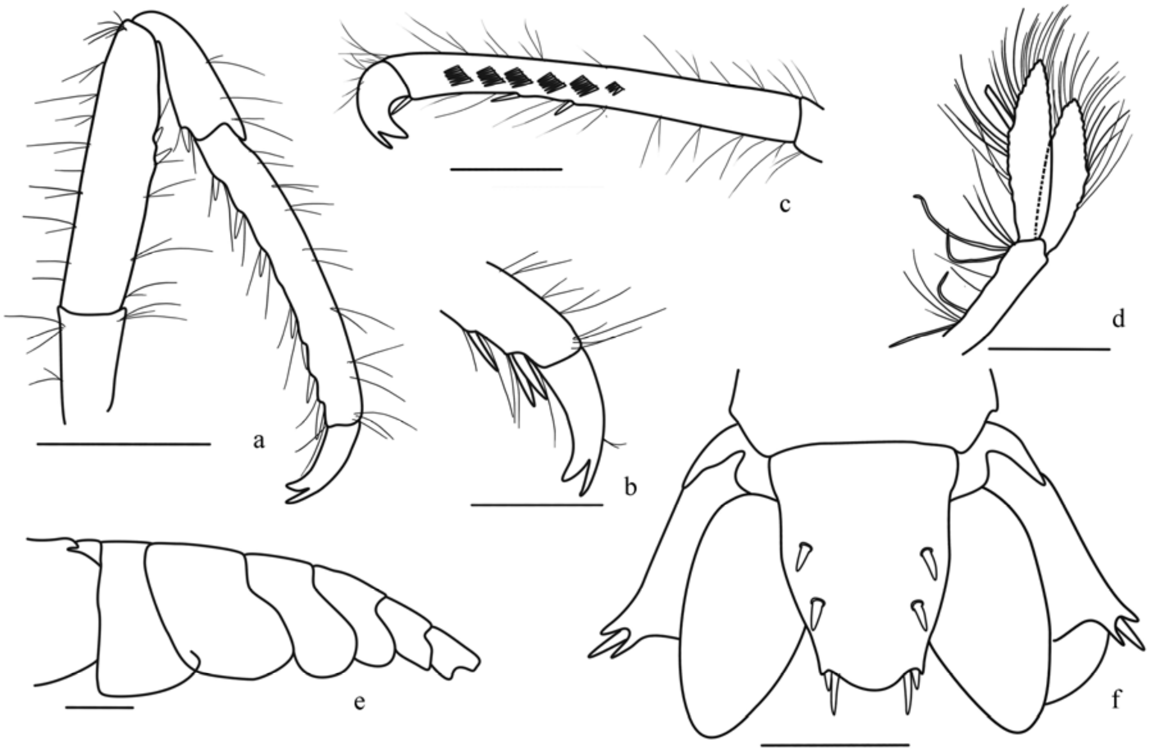

Fig. 42. *Synalpheus streptodactylus* Coutière, 1905, female (cl 5.1 mm) (MBM 270223). a–b. Fourth pereiopod. a. Lateral. b. Distal propodus and dactylus, lateral. c. Fifth pereiopod, propodus and dactylus, ventral. d. Second pleopod. e. Abdomen, lateral. f. Telson and uropod, dorsal. Scale bars: a, d–f = 1 mm; b–c = 0.5 mm.

segment of antennular peduncle; second segment about 1.5 times as long as wide at base; visible part of first segment longer than second and about twice as long as third. Basicerite with acute distodorsal tooth, distolateral tooth almost as long as stylocerite; carpocerite overreaching end of third segment of antennular peduncle; scaphocerite blade moderately broad, reaching 3/4 length of third segment of antennular peduncle, lateral spine developed, overreaching end of antennular peduncle, slight longer than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.3 times as long as wide at base; tip of ultimate segment bearing crown of five spine-like setae, with transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus about 2.7 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, with setae distodorsally; palm about 2.8 times as long as dactylus, distodorsal of palm with one acute projecting, slightly curved to dactylus; dactylus slightly longer than pollex, distally slightly curved.

Minor chela with merus about 3.7 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.5 times as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 5 : 1 : 1 : 1 : 1.8, with first segment slightly longer than sum of last four segment; dorsal margin of palm convex; fingers about 1.5 times as long as palm. Third pereiopod moderately slender; merus slightly shorter than propodus, about 4.5 times as long as wide at base, ventral margin with 2–5 spines; carpus about 1/2 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with seven spines along ventral margin plus one distal pair of spines near dactylus; dactylus about 1/4 length of propodus, slightly curved to propodus, biunguiculate, extensor tooth slight shorter than flexor tooth, notch between extensor and flexor tooth V-shaped, flexor tooth about twice as wide at base as extensor tooth. Fourth pereiopod generally similar to third; merus shorter than propodus, ventral margin of propodus with seven spines. Fifth pereiopod similar to third and fourth pereiopods, ventral margin of propodus with six transversal

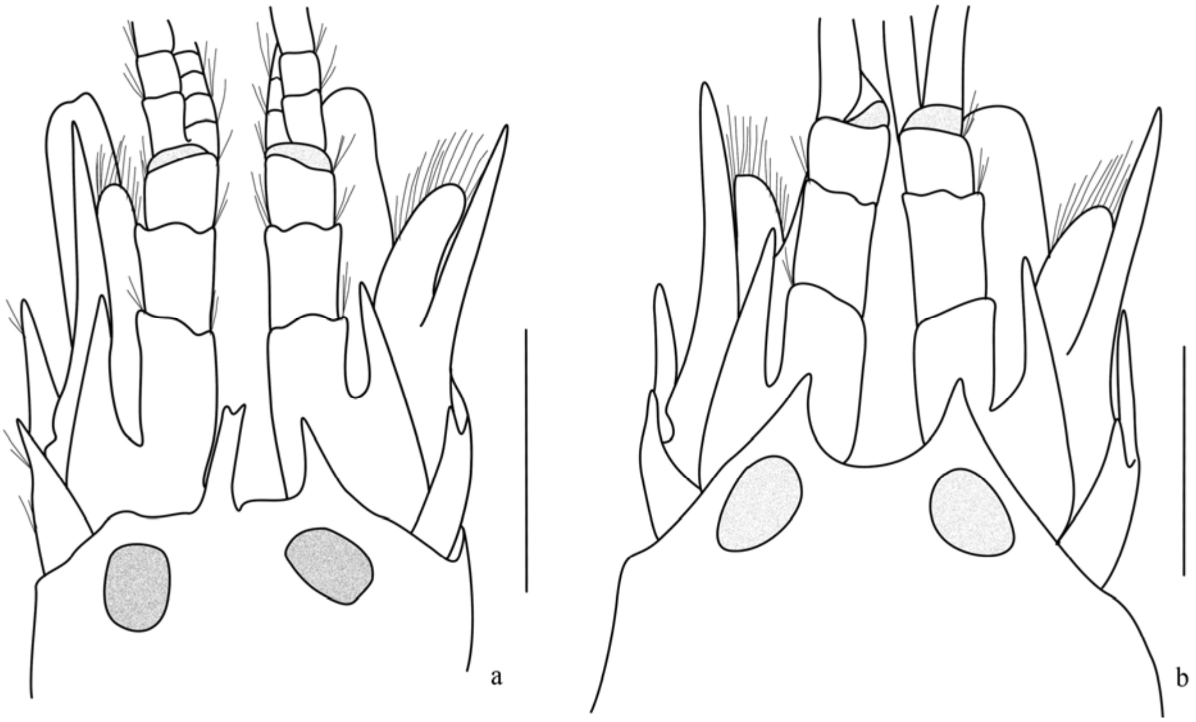

Fig. 43. *Synalpheus streptodactylus* Coutière, 1905. a. Male (cl 3.1 mm) (MBM 158375) frontal region, dorsal. b. Male (cl 4.5 mm) (MBM 107814) frontal region, dorsal. Scale bars = 1 mm.

rows of spine-like setae and two spines.

Remarks. This species was original described by Coutière (1905). Its variations and differences with *S. neomeris*, the morphological similar species, were well discussed by Banner & Banner (1975). *S. streptodactyloides* de Man, 1909 was described as a new form based on single specimen, which was subsequently synonymized as *S. streptodactylus* by Banner & Banner (1985).

The present abundant specimens are generally similar to each other, and all in the smaller size than *S. neomeris*. Additionally, two of our specimens are aberrant at the frontal teeth: the tip of the rostrum being bispineous (Fig. 43a), or another lost the rostrum (Fig. 43b). Those differences might be affected by the environment.

Distribution. East China Sea, South China Sea; Red Sea; Eastern and South Africa to Thailand; Indonesia; Japan; Australia to Hawaii; Philippines.

3.2.28 *Synalpheus theano* de Man, 1910

Synalpheus theano de Man, 1910. *Tijdschr. ned. dierk. Vereen*, 11(4): 296; 1911. *Siboga Exped.*, 39(2): 293, fig. 61; Banner & Banner, 1972. *Crustaceana*, 23(1): 20, fig. 3f (separation from *S. neptunus* (Dana)); Banner & Banner, 1975. *Records of the Australian Museum*, 29(12): pl. 314, fig. 10.

nec *Synalpheus theano* Banner & Banner, 1966. *Siam Soc. Mono.*, 3: 69, fig. 24 (= *S. neptunus*).

Distribution. South China Sea; Indonesia; Singapore; Australian.

Remarks. This species was reported by Liu (2008) from the South China Sea, but not found in the present specimens.

3.2.29 *Synalpheus tonkinensis* sp. nov. (Figs 44–45)

Material examined. Holotype (MBM 270602), ♀, CL 5.3 mm, TL 16.5 mm, Tonkin Gulf (Beibu Gulf), Sta. 7305, depth 62 m, 21 January 1962, coll. Fu-Zeng Sun. Paratype (MBM 270602), 1♂, CL 4.8 mm, TL 12.0 mm, same data as holotype.

Description. Carapace smooth, glabrous; rostrum flattened dorsally, with lateral margins slightly convex, rounded tip overreaching 1/2 length of visible part of first segment of antennular peduncle, tip of rostrum bearing two short setae; orbital hoods about twice as wide at base as rostrum, length almost equal to rostrum, rounded tip bearing two short setae; notch between orbital hoods and rostrum deep, between V- and U- shaped; pterygostomial corner produced into blunt acute angle.

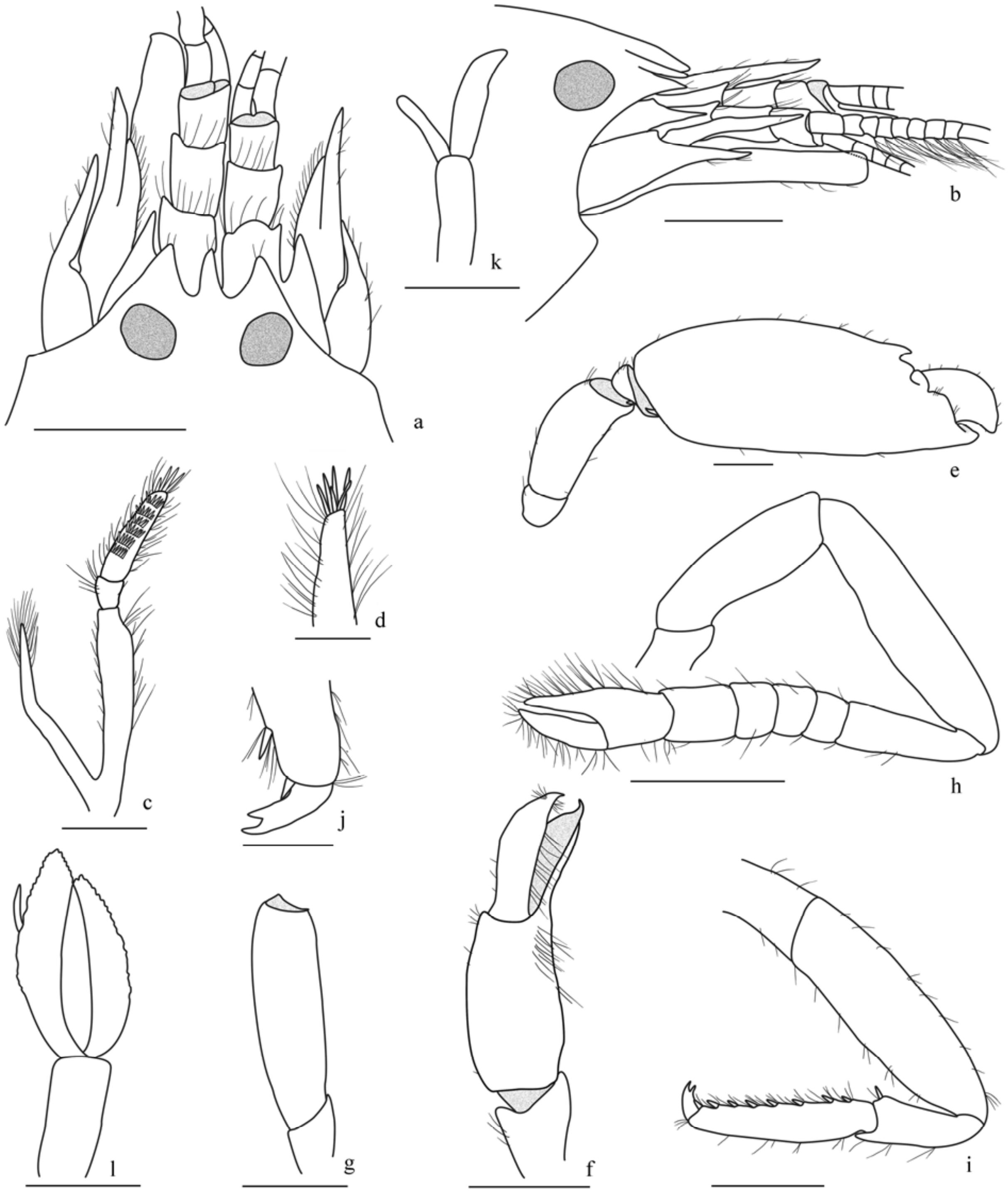

Fig. 44. *Synalpheus tonkinensis* **sp. nov.**, female (cl 5.3 mm) (MBM 270602). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Third maxilliped. c. Ventral. d. Tip, dorsal. e. Major cheliped, lateral. f–g. Minor cheliped. f. Lateral. g. Merus, lateral. h. Second pereiopod, lateral. i–j. Third pereiopod. i. Lateral. j. Distal propodus and dactylus, lateral. k. First pleopod. l. Third pleopod. Scale bars: a–i, k, l = 1 mm; j = 0.25 mm.

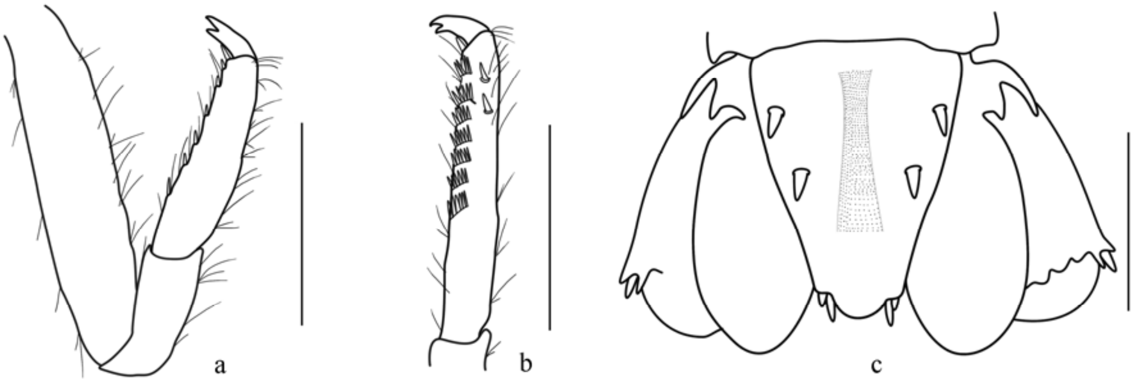

Fig. 45. *Synalpheus tonkinensis* **sp. nov.,** female (cl 5.3 mm) (MBM 270602). a. Fourth pereiopod, lateral. b. Fifth pereiopod, propodus and dactylus. c. Telson and uropod, dorsal. Scale bars = 1 mm.

Abdominal somites smooth, glabrous, sex bimorphology, female with posterior corner of first pleura broadly rounded, ventral and posterior margins of second pleura longer and wider; male with posterior corner of first pleura acutely produced ventrally. Telson about 1.4 as long as wide at base; lateral margins concave posteriorly; dorsal surface with two pairs of spines, inserted approximately at 1/4 and 1/2 length of telson; posterior margin strongly producing, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/2 length of mesial, posterolateral margins forming right angles.

Eyes concealed in lateral and dorsal view.

Antennular peduncle with distally acute stylocerite, latter hardly reaching distal margin of first segment of antennular peduncle; second segment distinctly longer than wide; visible part of first segment longer than second and about twice as long as third segment. Antenna with basicerite without distodorsal tooth, distolateral tooth distinctly longer than stylocerite, overreaching middle of second antennular segment; carpocerite beyond end of antennular peduncle by the length of third segment; scaphocerite blade narrow, hardly reaching end of second segment of antennular peduncle, lateral spine robust, with lateral margin slightly concave, subequal to antennular peduncle.

Mouthparts not dissected. Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest, about 5.5 times as long as wide; penultimate segment about 1.8 times as long as wide at base; tip of ultimate segment bearing crown of 5–6 spine-like long setae, with several brush consisting of 6–8 transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus three times as long as wide at base, superodistal margin rounded without any projecting, inferointernal margin with rounded tooth; carpus cup-shaped, with long setae distodorsally; chela cylindrical, not a bit compressed or twisted, with palm about 3.2 times as long as dactylus, distodorsal tooth on palm subacute, slightly curved downward to dactylus; dactylus far longer than pollex.

Minor chela with merus about two times as long as wide, longer than that of major cheliped, superodistal margin same with that of major cheliped, without any projecting; carpus cup-shaped, proportionally longer than that of major cheliped; palm 1.3 times as long as fingers, lateral margin near dactylus bearing patch of stiff setae; both dactylus and pollex dorsal surface convex, broadened from base to 8/9 length of fingers, terminating in slender, acute, curved teeth, crossing distally, lateral margins of fingers bearing 6–8 long stiff setae that cross in regular fashion.

Second pereiopod with ischium distinctly shorter than merus; carpus five-segmented, segment ratio subequal to 4: 1: 1: 1: 2, with first segment shorter than sum of last four segments; fingers 1.3 times as long as palm. Third pereiopod stout; merus longer than propodus, about four times as long as wide, without spines on ventral margin; carpus about 3/8 merus length, with dorsal margin extended into an obtuse tooth, ventral margin with one short distal spine; propodus with usual seven spines along ventral margin plus one distal pair of spines near dactylus; dactylus around 2/11 propodus length, biunguiculate, moderately slender, extensor tooth slightly longer, thicker at base than flexor tooth, notch between extensor tooth and flexor tooth V-shaped. Fourth pereiopod generally similar to third; but ventral margin of carpus without distal spine. Fifth pereiopod with merus about 3.7 times as long as wide, without spines on ventral margin; carpus about 9/11 merus length, ventral margin without distal spine; propodus as long as merus, with seven brush consisting of 5–6 transverse rows of short setae along on posterior face, and two mobile spines on ventral margin plus one distal pair of spines near dactylus.

Etymology. "Tonkin" means the Tonkin Gulf (Beibu Gulf), the type locality of this new species.

Type locality. Tonkin Gulf (Beibu Gulf), South China Sea.

Distribution. Tonkin Gulf (Beibu Gulf), presently known only from the type locality in South China Sea.

Remarks. *Synalpheus tonkinensis* **sp. nov.** is mainly identified by the configuration of the frontal region of the carapace; the shape of the major and minor cheliped and the telson. This new species can be distinguished from its morphologically similar species by the combination of characters summarized in Table 3.

Table 3. Characters useful for distinguishing *Synalpheus tonkinensis* sp. nov. from its similar species.

species characters	*S. coutierei*	*S. antenor*	*S. amabilis*	*S. neptunus neptunus*	*S. theano*	*S. lophodactylus*	*S. tonkinensis* **sp. nov.**
Distodorsal tooth of basicerite	Acute and prominent	Without	Without	Without	Without	Without	Without
Stylocerite compared to distolateral tooth of basicerite	Subequal	Subequal	Subequal	Subequal	Former distinctly shorter than latter	Former distinctly shorter than latter	Former distinctly shorter than latter
Distodorsal tooth on palm of major cheliped	Subacute, curved upward	Acute in male, blunt tubercle in female	Subacute, curved upward	Rounded prominence	Obtuse	Obtuse, slightly curved upward	Subacute, slightly curved downward
Distodorsal margin of merus, major and minor cheliped	Triangular tooth	Triangular tooth	Triangular tooth	Rounded	Triangular tooth	Rounded	Rounded
Distal of dactylus and pollex, minor chela	Single tooth	Dactylus two acute teeth, pollex small accessory tooth	Single tooth	Single tooth	Single tooth	Single tooth	Single tooth
Tip of third maxilliped	5–6 spine-like setae	5–6 spine-like setae	5–6 spine-like setae	5–6 spine-like setae	Setae	5–6 spine-like setae	5–6 spine-like setae
Notch between unguis and accessory tooth third pereiopod	U-shaped	V-shaped	V-shaped	U-shaped	V-shaped	U-shaped	V-shaped
Posterolateral angles of telson	Right angle	Little prominent	Little prominent	Right angle	Right angle	Acute tooth	Right angle
Posterior margin of telson	Strongly produced	Slightly convex	Strongly produced	Slightly convex	Slightly convex	Slightly convex	Strongly produced
Two pairs dorsal surface spine of telson	Large, inserted 1/5 and 4/7 length of telson	Large, inserted 1/2 and 3/5 length of telson	Large, inserted 1/2 and 3/4 length of telson	Small, inserted 1/4 and 1/2 length of telson	Large, inserted 1/5 and 2/5 length of telson	Varied, last pair located posterior to middle	Large, inserted 1/4 and 1/2 length of telson

3.2.30 *Synalpheus trispinosus* de Man, 1910 (Figs 46–47)

Synalpheus trispinosus de Man, 1910. *Tijdschr. ned. dierk. Vereen*, 11(4): 300; 1911. *Siboga Exped.*, 39(2): 288, pl. 12, fig. 58; Banner & Banner, 1981. *Zool. Med. Leiden*, 190: 82; Banner & Banner, 1981. *Mémoires Orstom.* Vol. 91: 221, figs. 2a-c; Banner & Banner,

1983. *Travaux et Documents de l'Orstom*, 158: pl. 107.

Material examined. (MBM 042237), 6♀, 6♂, CL 5.3–8.6 mm, TL 13.1–21.5 mm, East China Sea, Sta. 4082, depth 84 m, 1 July 1959; (MBM 042234), 3♀, 3♂, CL 5.1–9.5 mm, TL 13.5–24.1 mm, East China Sea, Sta. 4082, depth 86 m, 25 October 1959, coll. Rui-Yu Liu; (MBM 107822), 1♂, CL 6.2 mm, TL 14.1 mm, East China Sea, Sta. V-2, depth 99 m, 5

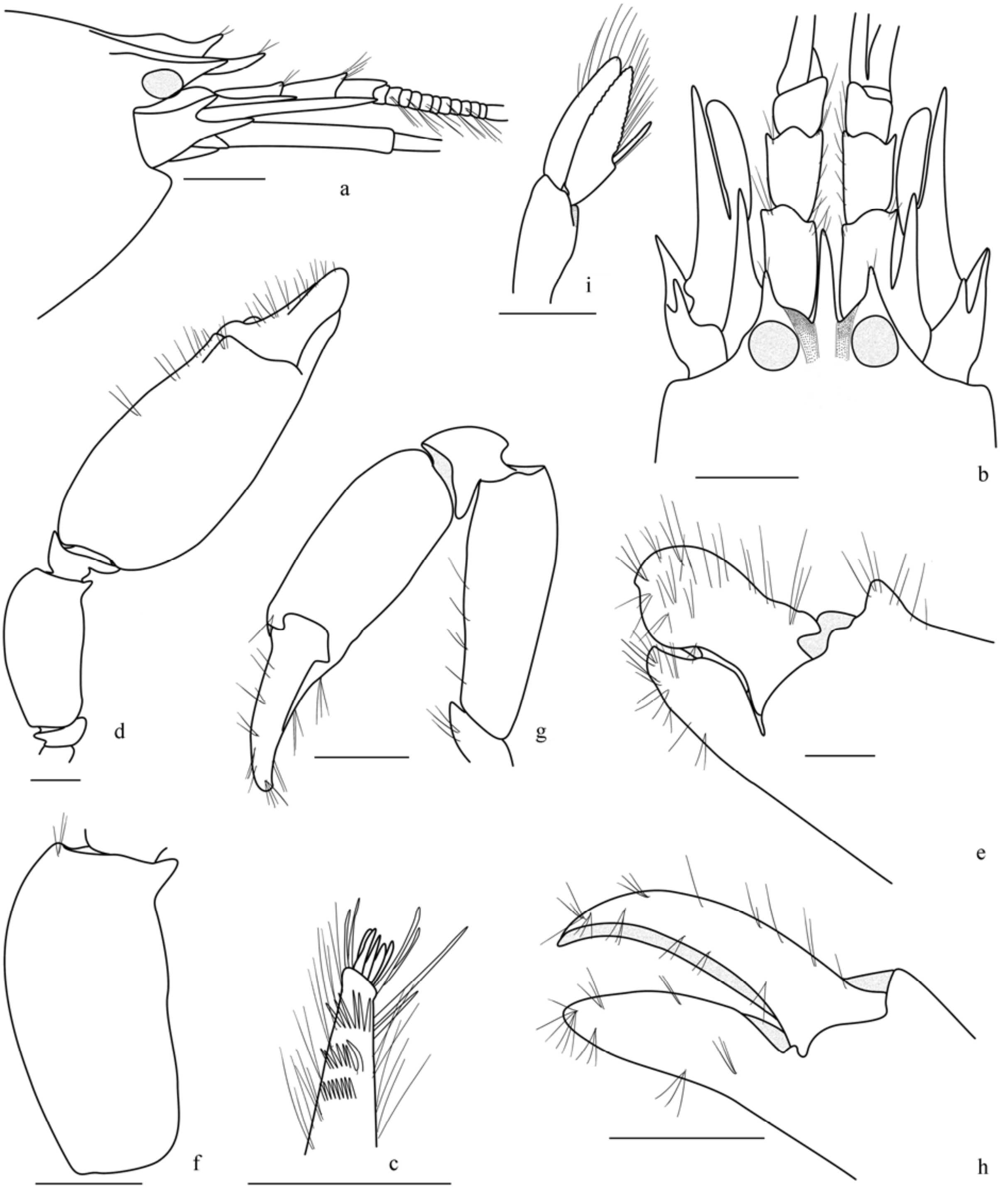

Fig. 46. *Synalpheus trispinosus* de Man, 1910, female (cl 9.5 mm) (MBM 042234). a–b. Frontal region. a. Lateral. b. Dorsal. c. Third maxilliped, tip, ventral. d–f. Major cheliped. d. Mesial. e. Chela, mesial. f. Merus, lateral. g–h. Minor cheliped. g. Mesial. h. Chela, lateral. i. Second pleopod. Scale bars = 1 mm.

July 1976, coll. Zhi-Chan Tang; (MBM 081144), 1♂, CL 5.6 mm, TL 13.9 mm, East China Sea, Sta. 4083, depth 90 m, 8 December 1959, coll. Yu-Hang Cui; (MBM 081143), 1♀, CL 8.1 mm, TL 19.8 mm, East China Sea, Sta. 4061, depth 81 m, 5 December 1959; (MBM 270162), 1♀, 2♂, CL 5.9–9.1 mm, TL 14.3–22.5 mm, East China Sea, Sta. 4081, depth 81 m, 2 February 1959, coll. Jie-Shan Xu; (MBM 042236), 4♀, 1♂, CL 6.6–8.8 mm, TL 14.9–22.5 mm, East China Sea, Sta. 4081, depth 79 m, 3 July 1959, coll. Li-Ren Cheng; (MBM 042232), 1♀, 1♂, CL 9.2 mm, TL 20.5 mm, CL 7.1 mm, TL 15.2 mm, East China Sea, Sta. 4081, depth 79 m, 25 October 1959, coll. Bao-Lin Zhang, Rui-Yu Liu; 3♀, (MBM 107825), 2♂, CL 5.4–7.7 mm, TL 12.1–17.9 mm, East China Sea, Sta. V-7, depth 100 m, 10 October 1975, coll. Zhi-Chan Tang, Jie-Shan Xu; (MBM 042238), 1♀, CL 8.4 mm, TL 20.2 mm, East China Sea, Sta. 4081, depth 79 m, 9 December 1959, coll. Yu-Hang Cui; (MBM 107814), 5♀, 2♂, CL 5.3–7.8 mm, TL 12.5–17.4 mm, East China Sea, Sta. V-3, depth 105 m, 27 August 1959, coll. Zhi-Chan Tang; (MBM 158587), 1♀, CL 8.1 mm, TL 18.3 mm, East China Sea, Sta. 0108, depth 94 m, 9 December 1959, coll. Yu-Hang Cui.

Description. Carapace smooth, glabrous; rostrum slender, about 3.7 times as long as wide at base, with lateral margins slightly convex, rounded tip bearing two short setae, varying from hardly reaching to slightly overreaching end of first segment of antennular peduncle, tip strongly curved upturned; orbital hoods distinctly shorter than rostrum, reaching middle of first segment of antennular peduncle, acute tip strongly curved upturned; pterygostomial corner produced into blunt acute angle; cardiac notch well developed.

Abdominal somites smooth, glabrous, posterior margin of sixth pleura with each angle one acute tooth, and an third tooth at middle, slightly shorter. Telson about 1.35 times as long as wide at base; lateral margin slightly concave posteriorly; dorsal surface with two pairs of moderately small spines, inserted approximately at 2/5 and 3/5 length of telson; posterior margin strongly produced, fringed with long setae, posterolateral angle each with two pairs of shorter spines, lateral slightly longer than mesial, posterolateral margins each produced into acute large tooth, slightly longer than lateral spines.

Eyes concealed in dorsal view, slightly exposed in lateral view.

Antennular peduncle slender, with distally acute stylocerite, latter reaching about 1/5 length of second segment of antennular peduncle, longer than or as long as rostrum; second segment about twice times as long as wide; visible part of first segment longer than second and more than twice as long as third. Antenna with basicerite with acute distodorsal tooth, less 1/2 length of distolateral tooth, latter distinctly shorter than stylocerite; carpocerite slightly beyond end of antennular peduncle; scaphocerite blade moderately narrow, hardly reaching end of third segment of antennular peduncle, lateral spine developed, with lateral margin slightly concave posteriorly, slightly overreaching end of antennular peduncle, shorter than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment twice as long as wide at base; tip of ultimate segment bearing crown of five long spine-like setae, with several transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus about 3.25 times as long as wide at base, superodistal margin without triangular tooth, but infero-external and infero-external margin each bearing acute triangular tooth; carpus cup-shaped, with setae distodorsally; palm about twice as long as dactylus, distodorsal of palm with one large triangular tubercle directed obliquely upturned, bearing fine setae; dactylus distinctly longer than pollex, bearing fine setae.

Minor chela with merus about 4.5 times as long as wide, longer than that of major cheliped, superodistal margin without any projecting; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.1 times as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, segment ratio subequal to 6: 1: 1: 1: 2, with first segment longer than sum of last four segment; dorsal margin of palm convex; fingers subequal to palm. Third pereiopod moderately stout; merus subequal to propodus, about 3.7 times as long as wide at base, with 5–9 spines on ventral margin; carpus about 1/3 merus length, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with nine spines along ventral margin plus one distal pair of spines near dactylus, dorsal margin with fine setae; dactylus around 1/8 propodus length, biunguiculate, extensor tooth longer than flexor tooth, and as wide at base as flexor tooth, notch between extensor and flexor tooth U-shaped. Fourth pereiopod generally similar to third; ventral margin of merus with six spines; ventral margin of carpus with one distal spine. Fifth pereiopod similar to third and fourth pereiopods, but ventral margin of carpus without distal spine, with merus about 3.3 times as long as wide, ventral margin without spines; carpus about 3/4 merus length, ventral margin without distal spine; propodus as long as merus, with 6–9 transversal rows of setae and 3 spines along ventral margin.

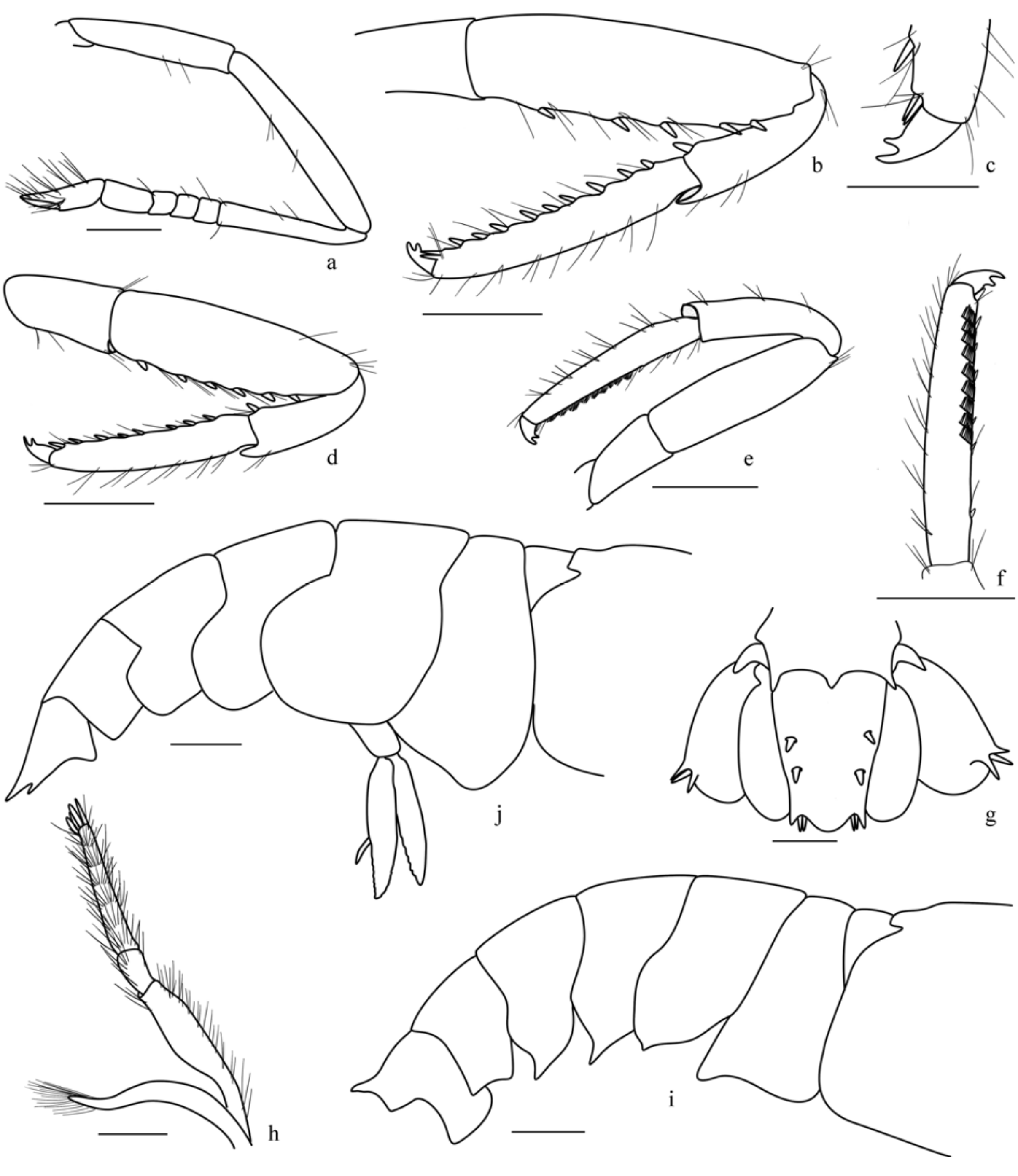

Fig. 47. *Synalpheus trispinosus* de Man, 1910. a–i. Male (cl 9.5 mm) (MBM 042234). a. Second pereiopod, lateral. b–c. Third pereiopod. b. Lateral. c. Distal propodus and dactylus, lateral. d. Fourth pereiopod, lateral. e–f. Fifth pereiopod. e. Lateral. f. Propodus and dactylus, ventral. g. Telson and uropod, dorsal. h. Third maxilliped, ventral. i. Abdomen, lateral. j. Female (cl 9.5 mm) abdomen, lateral. Scale bars: a–b, d–j = 1 mm; c = 0.5 mm.

Remarks. The species was original described by de Man (1910) based on a ovigerous female and a younger specimen collected from southern part of Molo-strait, in a depth 54–90 meters. The original description was actually rather simple and without figures. *Synalpheus trispinosus* was taken as a new species according to the posterior margin of sixth abdominal somite being trispinose. De Man (1911) redescribed this species in detail and provided some figures, based on the type materials.

S. trispinosus is morphologically most similar to *S. triacanthus* de Man, 1910 in the spines on the posterior margin of sixth abdominal somite. However, the merus of third pereiopods in *S. triacanthus* is not bearing spines, which can be separated from *S. trispinosus*.

The present materials (40 specimens), collected from the East China Sea, in the depth 79–105 meters, are agreed well with the holotype illustrated in de Man (1911), except the length of rostrum, which is variable from hardly reaching to slightly overreaching the end of first segment of the antennular peduncle.

Distribution. East China Sea, South China Sea; Gulf of Aden and eastern Africa to Philippines and Indonesia.

3.2.31 *Synalpheus tumidomanus* (Paul'son, 1875) (Figs 48–51)

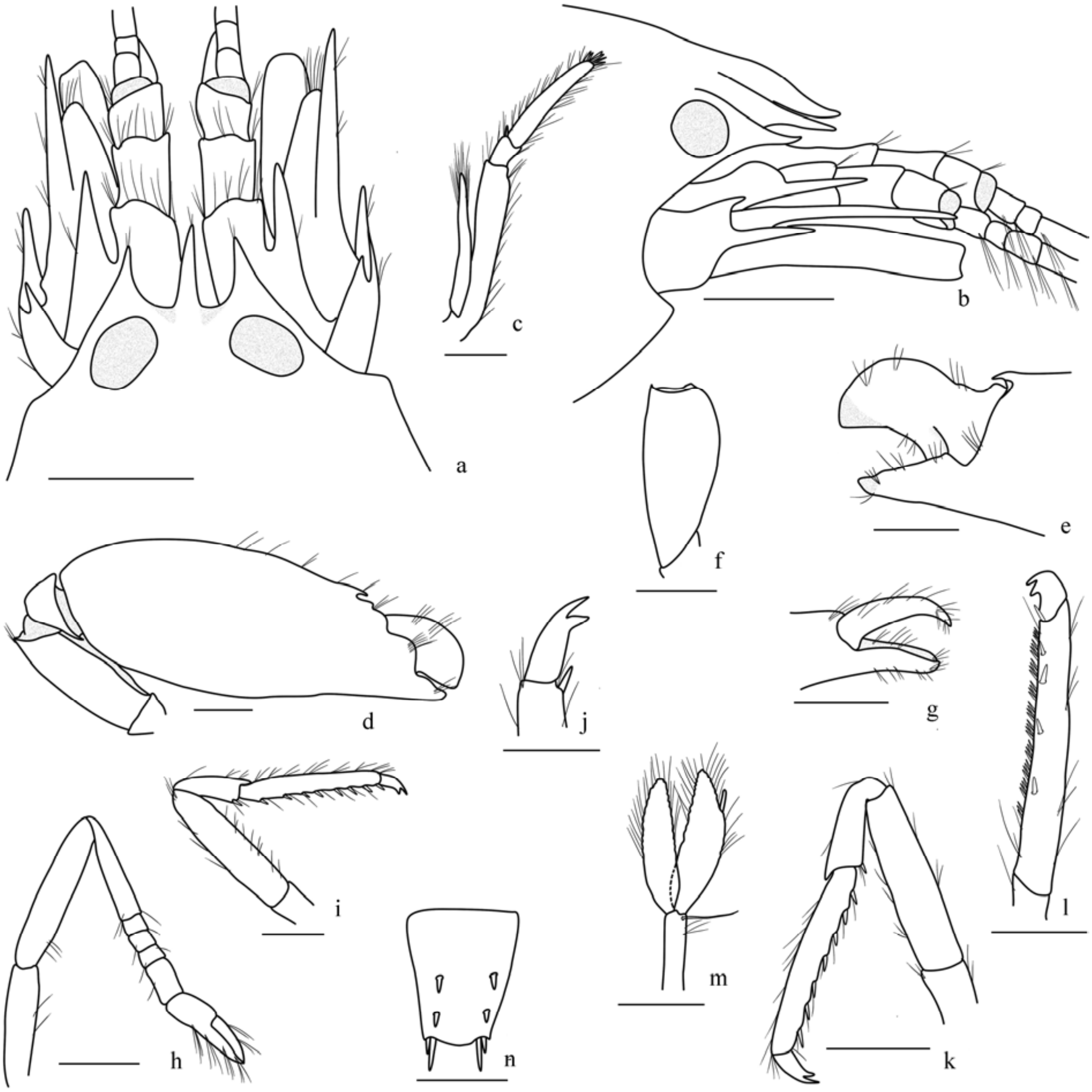

Fig. 48. *Synalpheus tumidomanus* (Paul'son, 1875), female (MBM 159000). a–b. Frontal region. a. Dorsal. b. Lateral. c. Third maxilliped, dorsal. d–e. Major cheliped. d. Lateral. e. Chela, lateral. f–g. Minor chela. f. Merus, lateral. g. Chela, lateral. h. Second pereiopod, lateral. i–j. Third pereiopod. i. Lateral. j. Distal propodus and dactylus, lateral. k. Fourth pereiopod, lateral. l. Fifth pereiopod, propodus and dactylus, ventral. m. Second pleopod. n. Telson, dorsal. Scale bars: a–i, k, m–n = 1 mm; j, l = 0.5 mm.

Alph.[*eus*] *tumido-manus* Paul’son, 1875. *Studies Crustacea Red Sea*, Part I: 101, plate 13, figs 2–2i.
Alph.[*eus*] *tumido-manus* var. *Alph.*[*eus*] *gracili-manus* Paul’son, 1875. *Studies Crustacea Red Sea*, Part I: 102, plate 13, figs 3–3c.
Synalpheus Hululensis Coutière, 1908. *Bull. Soc. philomath. Paris IX*, 11(5): 202.
Synalpheus Mac-Cullochi Coutière, 1908. *Bull. Soc. philomath. Paris IX*, 11(5): 203.
Synalpheus tumidomanus var. *exilimanus* Coutière, 1909. *Proc, U. S. natn. Mus.* 36(1659): 10.
Synalpheus Theophane de Man, 1910. *Tijdschr. ned. dierk. Vereen*, 11(4): 292.
Synalpheus anisocheir Stebbing, 1915. *Annals of the South African Museum*. 86, plate 87.
Synalpheus japonicus Yokoya, 1936. *Japanese Journal of Zoology* 7: 129–146,133, fig. 3.

Material examined. CL 4.2–6.1 mm, TL 7.5–13.9 mm. (MBM 159000), 3 ovigerous ♀, Sanya, Dadonghai, depth 2–3 m, 5 March 1997, coll. Xin-Zheng Li; (MBM 158898), 2♂, Sanya, Donghai, depth 2–3 m, 5 March 1997, coll. Xin-Zheng Li; (MBM 159158), 1 ovigerous ♀, 1♂, Sanya, Dadonghai, depth 6–9 m, 2 December 1997; (MBM 159310), 1 non-ovigerous ♀, Xincun, depth 1–3 m, 26 March 1992; (MBM 158202), 1♂, Sanya, Dadonghai, 1 March 1997, coll. Xin-Zheng Li; (MBM 159160), 1♂, Sanya, Dadonghai, 17 November 1997, coll. Xin-Zheng Li; (MBM 270055), 2 ovigerous ♀, 2♂, Xizhou island, 30 December 1955; (MBM 157827), 2 ovigerous ♀, 1♂, Shalao, depth 6 m, 4 April 1992; (MBM 158171), 1♂, Sanya, Dadonghai, 1 March 1997, coll. Xin-Zheng Li; 1♂, Xincun, 22 December 2007, coll. Lan-Ping Ding, Yong-Qiang Wang; (MBM 158503), 1♂, Yezhu Island, depth 10 m, 18 March 1992; (MBM 158887), 1 ovigerous ♀, Sanya, Dadonghai, 1 March 1997, coll. Xin-Zheng Li; (MBM 158724), 2 ovigerous ♀, 1♂, Shalao, depth 2 m, 4 April 1992; (MBM 107824), 10 ovigerous ♀, 4♂, Shalao, 5 April 1992; (MBM 107778), 1 ovigerous ♀, 2♂, Shalao, depth 6 m, coll. Xin-Zheng Li; (MBM 107745), 1♂, Shalao, 7 November 1990; (MBM 159158), 1 ovigerous ♀, 1♂, Sanya, depth 6–9 m, 2 December 1997; (MBM 156160), 1 ovigerous ♀, Sanya, Dadonghai, 17 November 1997, coll. Xin-Zheng Li; (MBM 107784), 3 ovigerous ♀, Shalao, depth; 12 m, 4 April 1992; (MBM 159299), 2 ovigerous ♀, 1♂; (MBM 107824), 2 ovigerous ♀, 1♂, Shalao, 5 April 1992; 1 ovigerous ♀, 2♂, Subi Reef, Nansha Islands, depth 3 m, 8 May 2004, coll. Yong-Qiang Wang; 1 ovigerous ♀, 1♂, Subi Reef, Nansha Islands, depth 2 m, 8 May 2004; (MBM 270163), 1♂, Tonkin Gulf (Beibu Gulf), Sta. 6210, depth 37 m, 8 January 1959, coll. Zhen-Gang Fan; (MBM 159244) 1♂; (MBM 158071), 1 non-ovigerous ♀, Dengqing island, 3 May 1958, coll. Zhen-Gang Fan, Jie-Shan Xu; (MBM 159262), 3♂, Sanya, Dadonghai, depth 4–6 m, 1 December 1997.

Description. Carapace smooth, glabrous; rostrum about twice as long as wide at base, acute tip not reaching or slightly overreaching end of first segment of antennular peduncle; orbital hoods shorter than rostrum, longer than wider at base; pterygostomial corner produced into acute angle; cardiac notch well developed.

Telson about 1.3 times as long as wide at base; dorsal surface with two pairs of spines, inserted approximately at 2/5 and 3/4 length of telson; posterior margin strongly produced, fringed with long setae, posterolateral angle each with two pairs of spines, lateral about 1/3 length of mesial, posterolateral margins each produced into acute tooth, but distinctly shorter than contiguous short spines.

Eyes concealed in dorsal and lateral view.

Antennular peduncle moderately slender, with distally acute stylocerite, latter reaching middle of second segment of antennular peduncle; second segment about 1.5 times as long as wide at base; visible part of first segment longer than second and less twice as long as third. Basicerite with or without distodorsal tooth, distolateral tooth shorter than stylocerite; carpocerite overreaching end of third segment of antennular peduncle; scaphocerite blade moderately narrow, reaching end of third segment of antennular peduncle, lateral spine developed, overreaching end of antennular peduncle, subequal to or longer than carpocerite.

Third maxilliped far beyond antennular peduncle and carpocerite when extended; antepenultimate segment longest; penultimate segment about 1.5 times as long as wide at base; tip of ultimate segment bearing crown of five long spine-like setae, with transverse rows of setae along ventral margin.

Major cheliped with short, stout ischium; merus about 3 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, with setae distodorsally; distodorsal of palm with at most an obtuse projecting or strongly acute tooth , slightly curved to dactylus; dactylus slightly longer than pollex, distally slightly curved.

Minor chela with merus about 3.6 times as long as wide at base, superodistal margin with one acute triangular tooth; carpus cup-shaped, proportionally longer that of major cheliped; palm about 1.3 times as long as fingers; dactylus and pollex tapering, distal single tooth.

Second pereiopod with ischium shorter than merus; carpus five-segmented, first segment subequal to sum of last four segments; dorsal margin of palm convex; fingers near as long as palm. Third pereiopod moderately stout; merus slightly longer than propodus, about 4 times as long as wide at base; carpus about 1/3 length of merus, with dorsal margin extended into an obtuse tooth, ventral margin with one distal spine; propodus with 6–8 spines along ventral margin plus one distal pair of spines near dactylus; dactylus about 1/4 length of propodus, slightly curved to propodus, biunguiculate, extensor tooth slightly longer than flexor tooth, notch between extensor and flexor tooth V-shaped, flexor tooth wider at base than or sub-wider at base to extensor tooth. Fourth pereiopod generally similar to third; ventral margin of propodus with 5–7 spines plus one distal pair of spines. Fifth pereiopod similar to third and fourth pereiopods, ventral margin of carpus without distal one spine; ventral margin of propodus with 5–8 transversal rows of spine-like setae and 3–5 spines.

Remarks. This species is rather complex (Banner & Banner, 1968, 1975). The present specimens are mainly variable

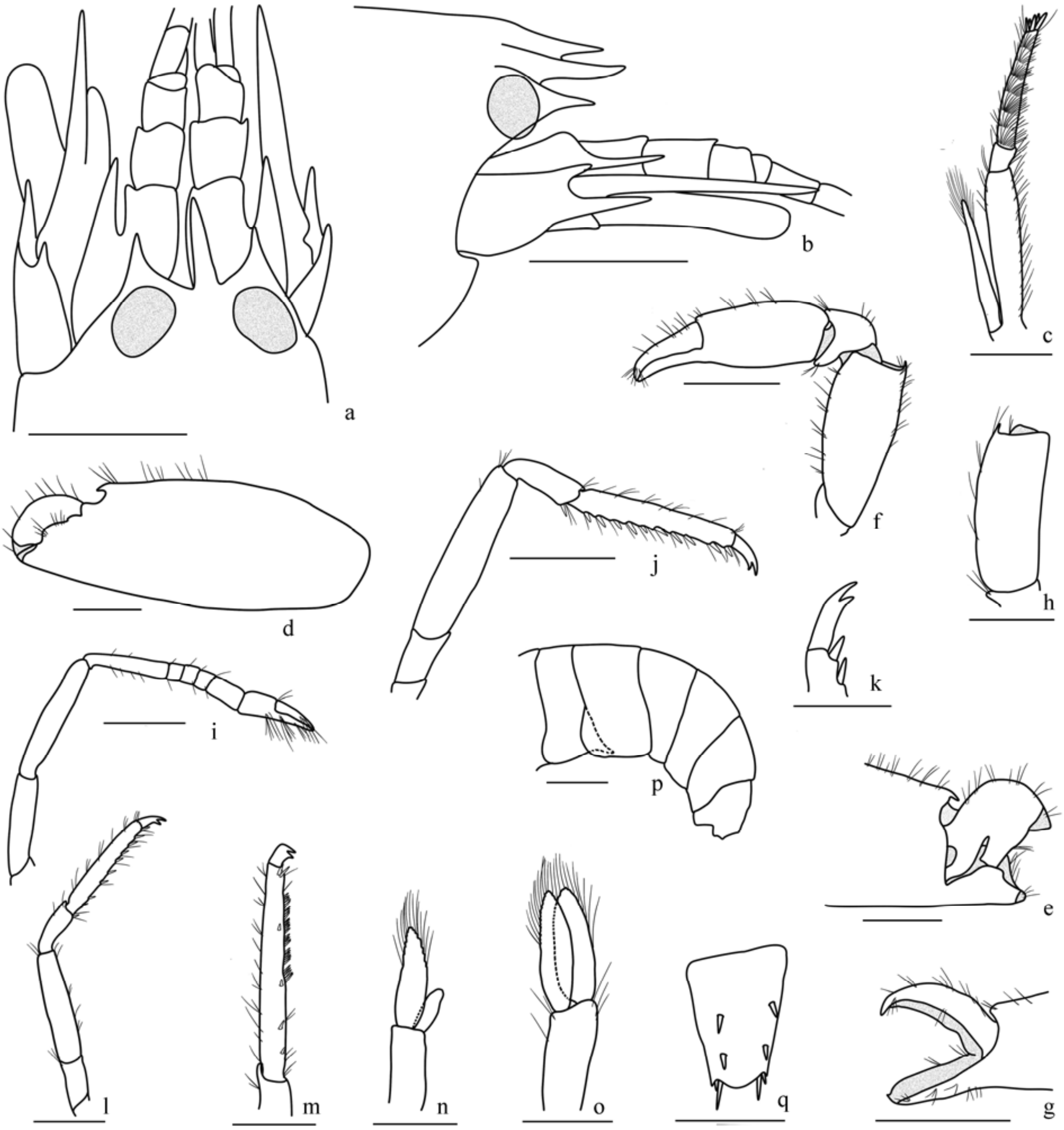

Fig. 49. *Synalpheus tumidomanus* (Paul'son, 1875), male (MBM 159158). a–b. Frontal region. a. Dorsal. b. Lateral. c. Third maxilliped, ventral. d–e. Major cheliped. d. Lateral. e. Chela, lateral. f–g. Minor chela. f. Merus, lateral. g. Chela, lateral. h. Minor chela, merus, lateral. i. Second pereiopod, lateral. j–k. Third pereiopod. j. Lateral. k. Distal propodus and dactylus, lateral. l. Fourth pereiopod, lateral. m. Fifth pereiopod, propodus and dactylus, ventral. n. First pleopod. o. Second pleopod. p. Abdomen. q. Telson, dorsal. Scale bars: a–f, h–i, k, o–p = 1 mm. g, j, l–n = 0.5 mm.

in the following characters: the length of the rostrum; the present or absent distodorsal tooth of the basicerite; the superior distal margin projecting of the palm in the major chela; the relative wide at base of the extensor and flexor tooth of the third pereiopod.

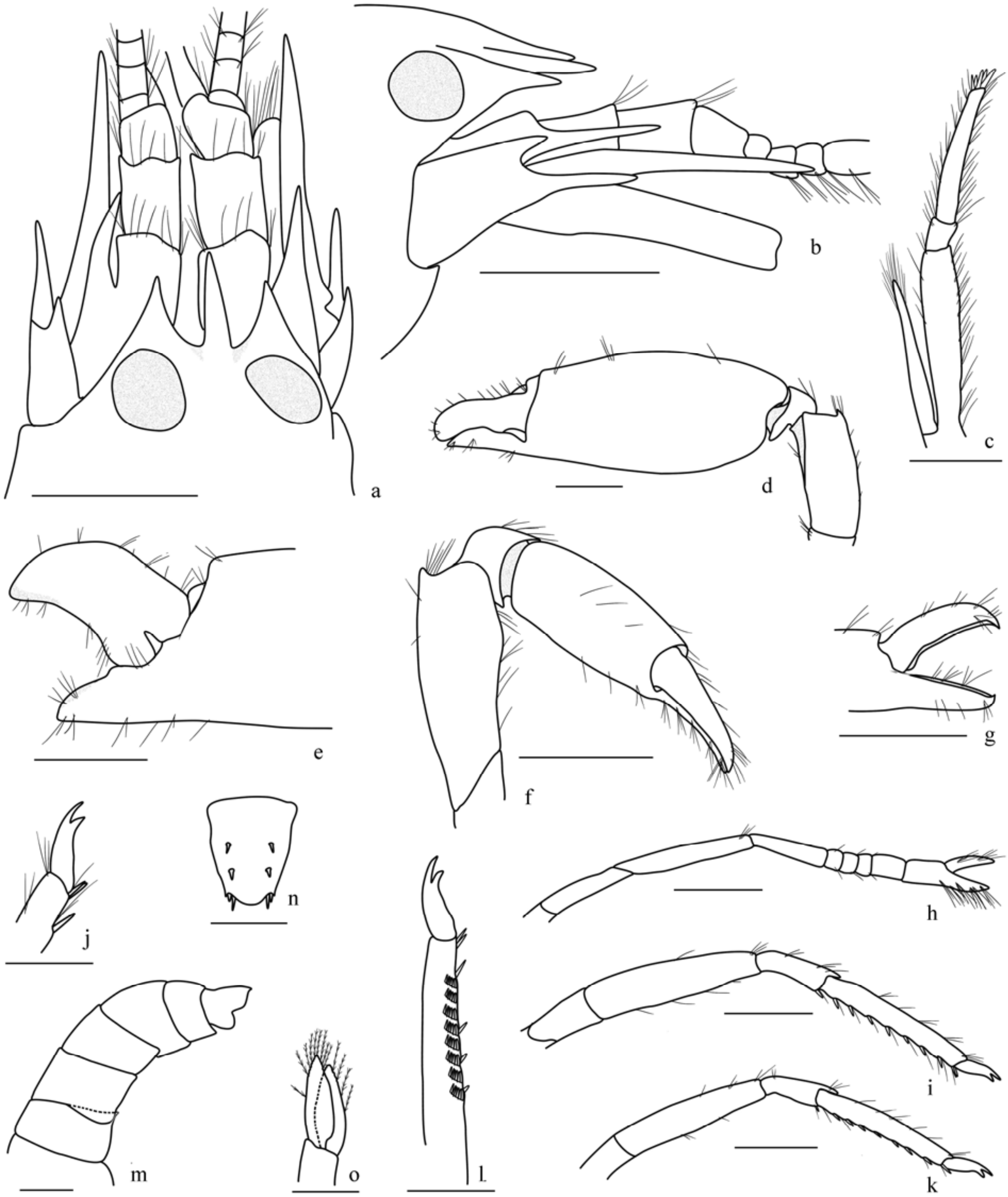

Fig. 50. *Synalpheus tumidomanus* (Paul'son, 1875), male (MBM 159244). a–b. Frontal region. a. Dorsal. b. Lateral. c. Third maxilliped, dorsal. d–e. Major cheliped. d. Lateral. e. Chela, lateral. f–g. Minor chela. f. Lateral. g. Chela, lateral. h. Second pereiopod, lateral. i–j. Third pereiopod. i. Lateral. j. Distal propodus and dactylus, lateral. k. Fourth pereiopod, lateral. l. Fifth pereiopod, propodus and dactylus, ventral. m. Abdomen. n. Telson, dorsal. o. Second pleopod. Scale bars: a–i, k, m–n = 1 mm; j, l, o = 0.5 mm.

Distribution. South China Sea; Mediterranean coast of Israel and Red Sea to South Africa, eastward to Japan; Philippines; Indonesia; Australia and across the Pacific to the Phoenix Islands.

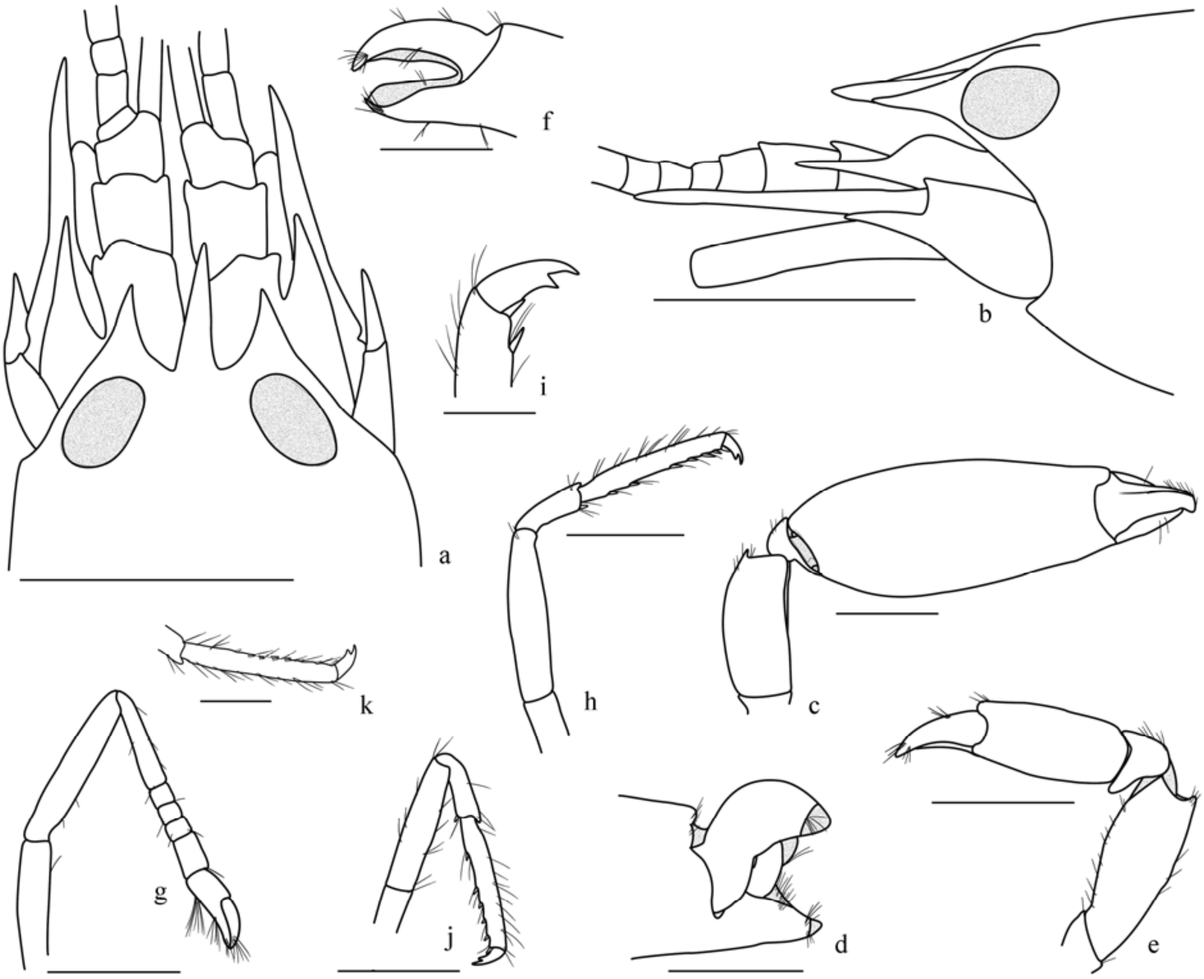

Fig. 51. *Synalpheus tumidomanus* (Paul'son, 1875), male (MBM 159262). a–b. Frontal region. a. Dorsal. b. Lateral. c–d. Major cheliped. c. Mesial. d. Chela, lateral. e–f. Minor cheliped. e. Mesial. f. Chela, lateral. g. Second pereiopod, lateral. h–i. Third pereiopod. h. Lateral. i. Distal propodus and dactylus, lateral. j. Fourth pereiopod, lateral. k. Fifth pereiopod, propodus and dactylus, lateral. Scale bars: a–e, g–h, j = 1 mm; f, i, k = 0.5 mm.

Key of the genus *Synalpheus* from China seas (modified from Banner & Banner, 1975; Chace, 1988)

1. Without orbitorostral process 2
   With orbitorostral process 6
2. Rostrum overreaching end of first segment of antennular peduncle and much longer than orbital hoods; dactylus of minor chela tapering 3
   Rostrum much shorter than end of first segment of antennular peduncle and subequal to orbital hoods; dactylus of minor chela spatulate 5
3. Distodorsal of palm of major chela without any projecting; distal of merus of third pereiopods normal, without acute tooth .... ***S. carinatus***
   Distodorsal of palm of major chela with one subacute projecting; distal of merus of third pereiopods bearing an acute tooth 4
4. Stylocerite reaching to about midlength of first segment of antennular peduncle .... ***S. odontophorus***
   Stylocerite reaching or overreaching end of first segment of antennular peduncle .... ***S. stimpsonii***
5. Merus of major and minor chela with superodistal margin rounded, without any projecting .... ***S. pescadorensis***
   Merus of major and minor chela with superodistal margin with acute triangular tooth .... ***S. liui* sp. nov.**
6. Dactylus of third pereiopods triunguiculate, but with inferior unguis at times reduced to a subacute angle 7

Dactylus of third pereiopods biunguiculate, never more than slight swelling as indication of third unguis.......10

7. Posterior margin of sixth abdominal somite projecting as 7–10 small teeth ....***S. mortenseni***

Posterior margin of sixth abdominal not projecting as teeth 8

8. Spines on propodus of third pereiopods confined to distal quarter or less; dorsal spines of telson either greatly reduces or absent.......***S. demani***

Spines on propodus of third pereiopod with spines along entire length; dorsal spines of telson always present and conspicuous 9

9. Merus of third pereiopod with spines on ventral margin.......***S. nilandensis***

Merus of third pereiopod without spines on ventral margin.......***S. fossor***

10. Sixth abdominal somite with acute posterior projection either side of base of telson 11

Sixth abdominal somite without posterior projection either side of base of telson 12

11. Rostrum much longer than orbital teeth, distolateral tooth of basicerite much shorter than stylocerite ....***S. trispinosus***

Rostrum subequal to orbital teeth, distolateral tooth of basicerite subequal to stylocerite ....***S. bispinosus***

12. Distal of dactylus and pollex of minor chela with 3 or 2 teeth....... **_S. jinqingensis_ sp. nov.**

Distal of dactylus and pollex of minor chela tapering, single tooth 13

13. Basicerite usually without distodorsal tooth.......14

Basicerite with distodorsal tooth 23

14. Dactylus of minor chela with definite longitudinal row of setae on crest or inner face.......15

Dactylus of minor chela bearing setae, but not in rows or patches.......16

15. Stylocerite shorter than first segment antennular peduncle, and short than distolateral tooth of basicerite; raw of setae on dactylus of minor chela medial to crest of finger; outer angles of telson small ....***S. lophodactylus***

Stylocerite overreaching end of first segment antennular peduncle, and subequal or longer than distolateral tooth of basicerite; row of setae on dactylus of minor chela on crest of finger; outer angles of telson usually heavy and strongly projecting.......***S. hastilicrassus***

16. Telson with posterior angles rectangular.......17

Telson with posterior angles usually acutely produced 21

17. Distolateral tooth of basicerite much longer than stylocerite 18

Distolateral tooth of basicerite shorter than stylocerite 20

18. Posterior margin of telson strongly protruding....... **_S. tonkinensis_ sp. nov.**

Posterior margin of telson almost straight.......19

19. Tip of third maxilliped bearing only fine setae ....***S. theano***

Tip of third maxilliped bearing circlet of short heavy spines ....***S. neptunus***

20. Third pereiopods slender, with extensor tooth of dactylus longer and wider at base than flexor tooth ....***S. biunguiculatus***

Third pereiopods stout, with extensor tooth of dactylus subequal to and much narrower at base than flexor tooth.......***S. charon***

21. Rostrum long and slender, overreaching middle of second segment of antennular peduncle, 5 or more times as long as wide at base.......***S. gracilirostris***

Rostrum shorter and more triangular, hardly overreaching end of first segment of antennular peduncle, not more than 3 times as long as wide at base 22

22. Dactylus of third pereiopods with uniform taper, and with extensor tooth longer and often wider at base than flexor tooth....... ***S. tumidomanus***

Dactylus of third pereiopods with slight swelling on inferior surface proximal to flexor tooth, flexor tooth subequal to or slightly shorter than and wider at base than extensor tooth....... ***S. paraneomeris***

23. Merus of third pereiopods unarmed with spines 24

Merus of third pereiopods armed with spines 25

24. Rostrum distinctly shorter than orbital tooth; scaphocerite blade and lateral spine much reduced; posterior pair of spines inserted posterior on dorsal margin of telson.......**_S. brevrostrus_ sp. nov.**

Rostrum subequal to orbital teeth; scaphocerite blade and lateral spine normal developed; posterior pair of spines inserted middle on dorsal margin of telson.......***S. coutierei***

25. Superior distal margin of palm of major chela with two conical, obtuse tubercles, directed forward and upturned .... ***S. bituberculatus***

Superior distal margin of palm of major chela with an acute tooth, straight or proximal to dactylus 26

26. Extensor tooth of dactylus of third pereiopods less than half as long and less than half as wide at base as flexor tooth 27

Extensor tooth of dactylus of third pereiopods subequal to or slightly shorter than and about half as wide at base as flexor tooth.......28

27. Fingers of minor chela compressed and subequal to or slightly shorter than palm ....***S. neomeris***

Fingers of minor chela not compressed and about half length of palm .... ***S. iphinoe***

28. Rostrum slender, about 5 times as long as wide at base, reaching middle of second segment of antennular peduncle ....***S. modestus***
Rostrum shorter, less than 3 times as long as wide at base, hardly reaching end of first segment of antennular peduncle 29
29. Third pereiopod with terminal teeth of dactylus longer, 1/4–1/3 as long as segment.. ***S. streptodactylus***
Third pereiopod with terminal teeth of dactylus much reduced, 1/10–1/6 as long as segment.. 30
30. Propodus third pereiopod with distinct superior curvature, ventral margin with only two spines, plus one or two terminal spines ......
.... ***S. pococki***
Propodus of third pereiopod only slightly curved, ventral margin with numerous spines.. ***S. iocasta***

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